The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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Improved Battery Guns.

For some three years past Dr. J. H. McLean, of St. Louis, Mo., has been conducting a series of experiments at New Haven, Ct., with some important inventions relating to the construction and mechanism of guns. A factory has been equipped, skilled labor employed, and everything done to test the new ideas under the most favorable circumstances, and in the most thorough manner. His new engines of warfare have now so nearly reached completion as to warrant the publication of a brief account in our columns. One or two private exhibitions of the workings have already been given before experts, invited guests and representatives of the press. A public test of their powers and range is to be made at no distant day.

The following general description, which appeared in the August number of *Scribner's Magazine*, will give our readers a fair idea of the weapons:

The plan upon which these new arms are constructed is essentially the same, whether it is applied to a sporting gun, battery or machine rifle, or field gun for horse artillery. It may also be applied to the largest sized siege gun, though the guns already constructed range only from a shot gun to a field gun throwing solid shot or shells. In all the magazines are placed on either side of the gun barrel, so that they can be easily removed for loading with cartridges. The cartridges are pushed into the open end of the magazine till it is full, when the coiled spring in the magazine tube is locked automatically, preventing the spring from pushing the shots out until released by pressure of the finger on a stop on the outside of the tube. In the shot gun two tubes are placed on each side of the barrel, and are designed to hold from 32 to 64 shots, according to the size of the gun.

In the military rifle the magazines are placed in a circle round the barrel, and, when filled, will carry 128 shots, all of which may be fired in succession in less than one minute. The firing apparatus consists essentially of a steel slide containing two chambers and designed to move laterally in the stock behind the barrel, one chamber always being in line with the barrel. The movement of the mechanism is very simple. While one cartridge is pushed by the spring from the tube into one chamber, another is being fired from the barrel. The next movement repeats this on the other side of the gun, and, at the same time, the exploded cartridge is pulled out and allowed to fall to the ground. The mechanism appears to work with precision and with the least exertion on the part of the gunner. The barrel is screwed into the loading and firing apparatus and is quite distinct from it, so that a new barrel can be put on if required. This also admits of the use of old barrels in making the improved arm. To compensate for the increased weight of so many magazines and shots, the gun is made quite light, and to compensate for the recoil that is so troublesome in a light gun, a rubber recoil cushion of a novel form is placed in the firing apparatus, to take up the shock when the gun is fired. The single-barrel guns examined consist of a small rifled gun on a light carriage—with the slide for loading and firing, but without magazines, the cartridges being slipped into the open chamber of the slide alternately exposed on each side as the gun is fired—a long and light rifled gun, and a regular field piece for throwing shells.

In the long rifled cannon eight magazines are ranged round the barrel in a circle. These may be filled with solid shot or with case shot or with shells. By turning a hand crank any magazine may be brought to the firing slide, so that shells, case or solid shot may be fired at will. The movement of the slide is controlled by a hand lever, moving from side to side, the charging and firing being all done by one motion, one man being able to fire the gun continuously at a speed of from one to two shots per second. In the field gun four magazines are placed on each side of the gun, the firing mechanism being the same as in all the other guns, and controlled by the movement of a single lever. The barrel is of steel, rifled and designed for very long range. It is screwed into the firing apparatus, so that if injured it can be replaced in a few minutes. The magazine tubes are loaded in position, though they can be removed if injured, or if more convenient to load them at some other place. In this gun the powder and shot are inclosed in a steel case that serves as a gas check, and at the same time keeps the gun clean. A recoil cushion is also provided, and, by permitting the case to retreat, enlarges the space for the formation of gas. The gun is mounted on a steel frame moved at two points, so that it can be elevated or depressed by turning a hand crank. This form rests on a table, giving it free play in a horizontal plane, so that the gunner, by turning a crank, can swing the gun entirely round the horizon in a few seconds. The whole is placed on a four-wheel carriage, so as to be above the horses, and enabling the gunner to fire directly over their heads, even when on the full gallop. The same general system of construction is designed to be applied to guns of the largest size, but so far only field artillery has been constructed.

In machine guns the same system has been carried out. In the gun shown in Fig. 1, 36 heavy rifles are placed in line, and above and below each barrel is a magazine, each carrying 22 shots, making in all 72 magazines, holding 1582 shots, all of which may be fired by one man in less than one minute. This arm is also mounted on a pivoted frame, with mechanism for depressing and elevating, and stands on a table having a free horizontal motion in every direction. The whole is placed on a four-wheel carriage, designed for horses or men, and is to be accompanied by a one-horse cart, containing a large supply of magazines already filled, besides extra cartridges in boxes.

Fig. 2 shows what is called a magazine cannon, which, in this case, consists of a central rifled barrel surrounded by four magazines. It is capable of firing 48 shots per minute. Both styles of guns, it will be seen, admit of adjustment not only to the right and left, but may also be raised or depressed, each movement being accomplished by turning a small hand wheel. The firing is controlled by the lever which is seen projecting above both guns. By turning it from left to right, a cartridge is pushed from a magazine into the chamber of the moving slide, while another is being fired from the second chamber. The next movement repeats this, and at the same time discharges the empty shell of the cartridge just fired. The slide in the gun, shown in Fig. 1, has as many chambers in each end as there are barrels (36), and moves back and forth vertically. That in Fig. 2 moves from side to side, and there being but one barrel in the gun, it has but two chambers.

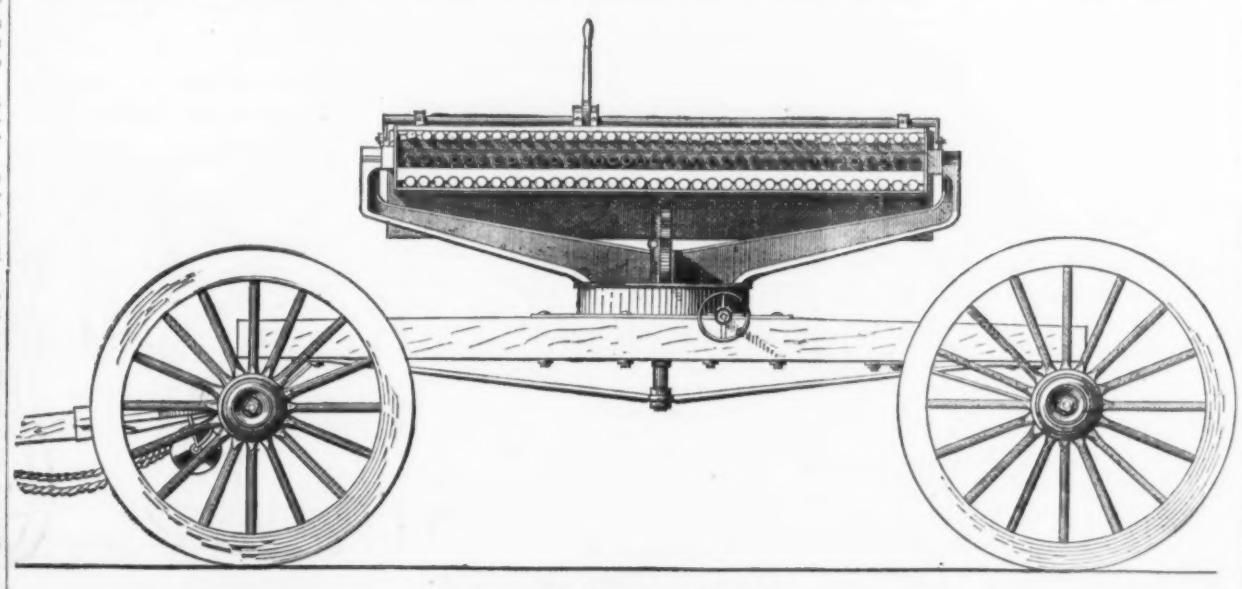

Fig. 1.—The McLean Battery Gun.

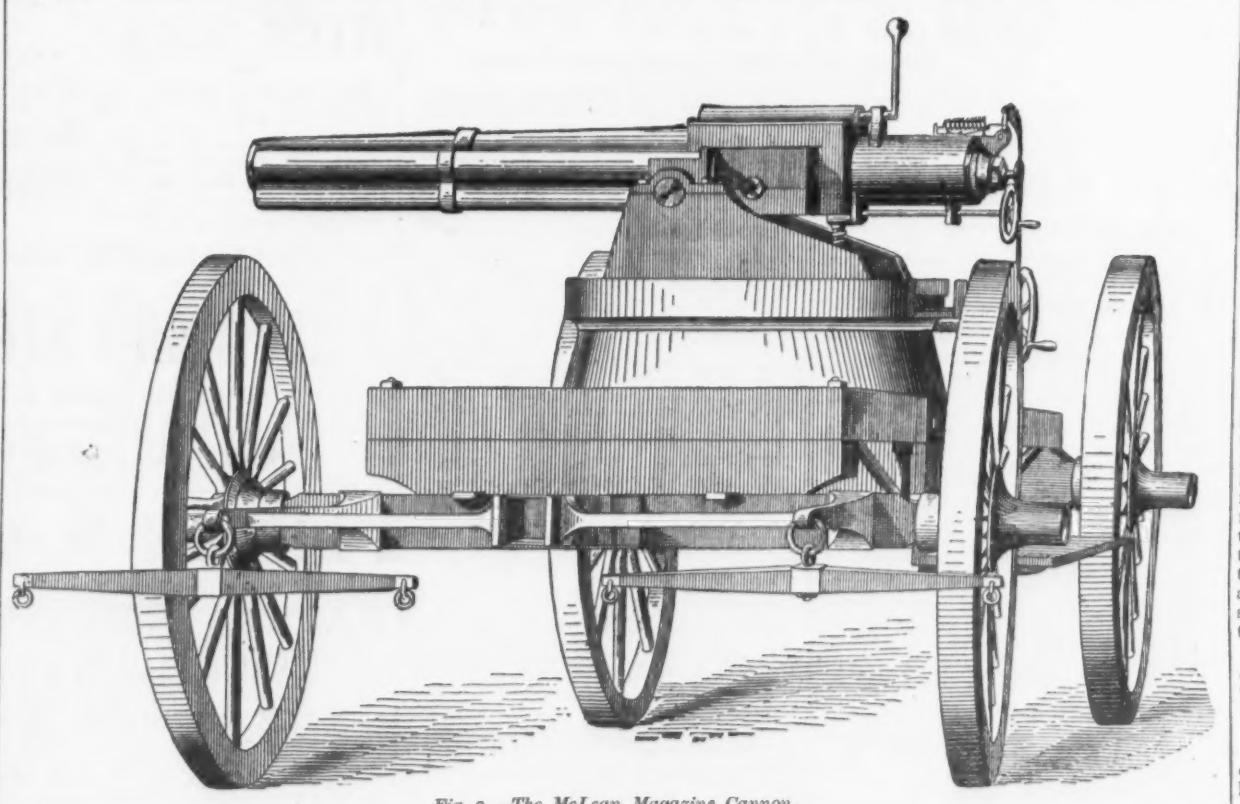

Fig. 2.—The McLean Magazine Cannon.

The *Colliery Guardian* publishes the following as the production of coal in the leading countries in 1879, the total being within 10,000,000 tons of the whole production of the world:

	Tons.		Tons.
U. Kingdom	133,720,303	Belgium	15,447,292
United States	60,850,000	Austria	5,378,604
Germany	42,031,726		
France	17,104,845	Total	274,532,860

The aggregate production of the other unenumerated countries, for which statistics are not yet available, probably amounts to 10,000,000 tons—that is about the average of recent years.

Prof. Henry's Scientific Researches.

Before the Association for the Advancement of Science, Prof. Alfred M. Mayer, of the Stevens Institute, read a eulogy of the late Prof. Joseph Henry, which sums up admirably the history of that eminent scientist's numerous and varied investigations. Prof. Henry began his electrical researches at the age of 28, in the year 1827, while he was Professor of Mathematics and Natural Philosophy in the Albany Academy. During 14 years, while between the ages of 28 and 43, he was a constant and fertile worker. About 1820 men of science spoke of electrical knowledge as almost complete. The mathematical consequences of the laws discovered by Coulomb and others, having been, they thought, fully developed, electricity was hardly to be regarded as an experimental science, but henceforth might be grouped with mechanics. Nevertheless, in the year 1819, Oersted announced that he had discovered a correlation of actions between electricity and magnetism, in his celebrated experiment of the deflection of a magnet athwart the conjunctive wire of a battery, when the latter was laid parallel to the direction of the magnet. This discovery was soon followed by the results of Ampère in the same field, who was soon led to form a hypothesis of the action of a magnet, and stated his well-known conception of minute currents of electricity whirling all in the same direction around the steel molecules, in planes at right angles to the axis of the bar. Guided by Ampère's discovery that a helix conducting a voltaic current had properties similar to those of a magnet, Arago inferred that these properties could be given to iron and steel by placing wires or bars of these metals in the interior of Ampère's helices. Experiments verified his inferences. Six years before Henry began his work, Faraday, then 30 years of age, and an assistant of Davy, published his first paper on electrical research.

The history of another research bears directly upon one of Henry's investigations; in 1827 Savary began experiments on the magnetizing action of the discharge of the Leyden jar on steel needles. After long and tedious research he was led to the supposition that the discharge was not continuous, but consisted of a series of rebounds or reflections to and from the coatings of the jar. In 1842, Henry, apparently ignorant of the work of Savary, went over the same ground, and arrived, independently, at the same results, which have since been confirmed by photographing its images produced by a revolving mirror. William Sturgeon, of Woolwich, found that by bending the bars used by Arago into U-shaped pieces, the strength of the magnet was greatly increased, and these experiments evidently led Henry to his first and his most important scientific research. As with many other men of originality, Henry's first essays were in the direction of improving the means of illustrating well-established facts and principles. His first paper, of October, 1827, is interesting, because it was his first. In it he improves on the usual apparatus which had been used by Ampère and others to show electro-dynamic actions, by employing several turns of insulated wire instead of one.

We now reach a period when Henry appears as a discoverer of no mean order. It is related that one evening he was sitting in his study in Albany with a friend when, after a few moments of reverie, he arose and exclaimed, "To-morrow I shall make a capital experiment." For several months he had been brooding over Ampère's electro-dynamic theory of magnetism, and he was then deeply interested in the phenomena of the development of magnetism in soft iron, as shown in the experiments of Arago and Sturgeon. At the moment he had arisen from his chair it occurred to him that the requirements of the theory of Ampère were not fulfilled in the electro-magnets of Arago and of Sturgeon, but that he could get those conditions which the theory required by covering the enveloping wire with a non-conductor like silk and then wrapping it closely around the soft iron bar in several layers. Henry's first discovery soon sprang from the experiments to which his reasoning had led him, for when he constructed his magnet on the principle which occurred to him, he found that it would sustain several times more weight than did Sturgeon's magnet of equal size and weight. The most powerful of Henry's magnets was constructed while he was at Princeton, and is thus described by Prof. R. H. McCulloch: "It is formed of a bar of rounded iron nearly 4 inches in diameter, weighing about 100 pounds and surrounded with 30 strands of copper bell wire, each about 40 feet long. With a calorimotor on Dr. Hare's plan, consisting of 22 plates of zinc, each 9 inches by 12, alternating with plates of copper of the same size, it supports 3500 pounds, or more than a ton and a half." Mr. Frank L. Pope examined this magnet at the college, and he says, in his eulogy of Henry: "There, too, was the reversing commutator, a device first invented by Prof. Henry, with which he was accustomed to delight and astonish his pupils by suddenly reversing the polarity of his large magnet, causing it to drop its armature and to seize it again before it passed beyond the sphere of attraction, a principle which we see exemplified in every stroke of the neutral relay of the quadruplex telegraph of to-day." Barlow, after some experiments with currents passing through long wires, wrote as follows: "In a very early stage of electro-magnetic experiments, it had been suggested (by La Place, Ampère and others) that an instantaneous telegraph might be established by means of conducting wires and compasses, but I found such a sensible diminution with only 200 feet of wire as at once to convince me of the impracticability of the scheme." Five years later Henry showed the error of that opinion by demonstrating the relations which must necessarily exist between the kind of battery used and the kind of magnet in order to produce electro-magnetic action at a distance. This accomplishment justly entitles him to be regarded as a man of genius and a discoverer of no mean order. The discovery will always remain the one important fact that was to be known, to be understood and to be applied before it was possible to have constructed any form of electro-magnetic telegraph. Henry not only made the discovery, but he also constructed an electro-magnetic telegraph, which was the first one that had worked through so great a length of wire, the first in which an electro-magnet had worked successfully, and the first "sounding" electro-magnetic telegraph. It is not generally known that Henry and Faraday independently discovered the means of producing an electric current and the electric spark from a magnet. Although Henry was preceded in the discovery of the magneto-electric current by Faraday, it is undoubtedly true that he was its second independent discoverer. In 1838 Henry discovered an entirely new class of phenomena in electrical induction, which opened a wide field for investigation, of which he was not slow to take advantage. The results which he obtained now form part of the doctrine of modern physics, and his studies of the nature and laws of induced currents of different orders are the most finished of Henry's works.

Henry had a versatile mind, and did not confine his attention to the study of electricity. His genius has adorned all departments of physics. His researches in molecular physics, though not extensive, are remarkable. In 1839 he made the curious discovery that lead was permeable to mercury—so much so that mercury would ascend a lead wire to the hight of a yard in a few days. Later he investigated the nature of the forces acting in liquid films. He also studied acoustics with great interest, and conducted experiments in connection with our system of fog signals, and finally concluded that the syren fog-horn was the most powerful and effective signal instrument known, and that its sound can be heard to the greatest distance when tuned to emit a note in the treble part scale. One of his investigations holds such an important place in the history of science that it should be mentioned. This is the application of the thermopile to the determination of the distribution of heat in the optical image of distant objects, and he was thus able to detect a difference between the temperature of a sun-spot in an image of the sun and that of the portion of the sun surrounding that spot.

Experiments with Explosive Gas Mixtures.

Mr. H. McLeod, writing to *Nature* on the explosion of the gas main near the Tottenham-court road, says it appears to be an example on a large scale of the phenomenon which occurs on the bursting of a eudiometer. It is known, he says, although he does not speak from experience, that when such an accident happens the glass gives way at the surface of the mercury in the tube, for at this point the explosion is most violent, in consequence of the gas being compressed by the explosion of that above it. When no accident takes place the flash of light is more brilliant at the surface of the mercury than in the upper part of the tube. In order to see if this fact would throw any light on the explosion of the gas main, he tried a few experiments a short time ago, an account of which may possess some interest. A piece of combustion tube 6.33 feet long and 0.53 inch in diameter was closed at one end, and at 3.94 inches from the open end of the tube a pair of platinum wires was sealed into the glass. The tube was filled over water with a mixture of hydrogen and oxygen obtained

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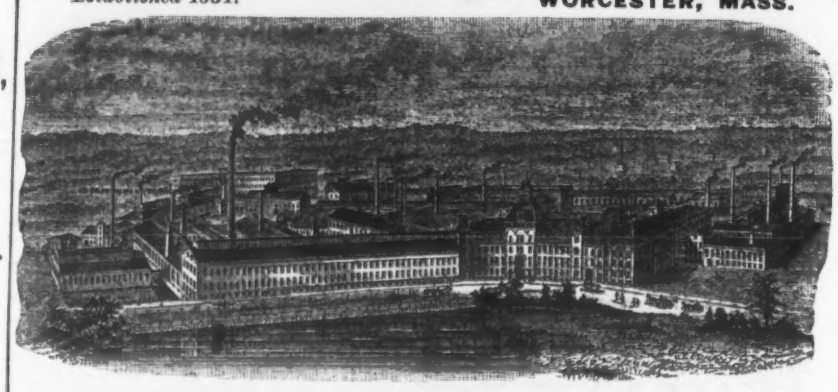

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by the electrolysis of dilute sulphuric acid, and the mouth of the tube closed with a plug of wet cotton wool. The tube was placed on a lawn and secured to a heavy weight by a piece of string tied near the open end; a spark from an induction coil was then passed between the wires. The explosion of the gas blew out the plug of cotton wool and bent the platinum wires against the sides of the tube, but the glass was not broken. The tube was again filled with the mixed gases and closed with a cork, which was not forced tightly into the mouth of the tube. This time the tube burst in the middle, leaving 30.7 inches of the closed end and 23.2 inches of the open end without damage. The cork was projected some distance, but the wires were not bent by the rush of gas; the closed end of the tube was only slightly moved from its original position by the explosion. Another piece of similar tube, but only about 34.6 inches in length, was next filled with gas and exploded in the same manner. The closed end was burst, and 18.7 inches of the open end remained. In this case the cork was also projected, but the wires were not bent. The experiment being made at night, it was noticed that the flash was much more brilliant at the closed than at the open end of the tube.

SCIENTIFIC AND TECHNICAL.

In an address before Section A of the American Association for the Advancement of Science, at Boston, Prof. Asaph Hall spoke admirably and strongly on

THE WORK BEFORE ASTRONOMERS.

For the full development of the secular changes of our solar system, and for an accurate knowledge of the proper motions of the stars, and of the great changes of light and heat among them, we must wait for future ages. The observations of to-day should, therefore, be made so accurately that the astronomers in the future may use our results to detect and measure the changes which take place during centuries. Although the objects for observation are numerous, there is danger that astronomers may waste their opportunities by doing work that has no intrinsic value. It is useless to examine the orbits of the planets, for they are already well determined, with the exception of that of Neptune, for which we must wait for time to reveal any small peculiarities that it may have. For all the planets, observations at one or two observatories are amply sufficient for the needs of science, and even these should be confined to a short time near the apposition, or at quadrature. Even now the observation of planets is in advance of theory. In the case of Saturn, for example, all the tables are in error, but this is because there is some defect in the theory. Observations of the moon, also, might be profitably confined to two observatories. All the lunar ephemerides are affected with empirical terms, and the lunar theory is still an unsolved mystery. On the other hand, observations of the fixed stars are of the utmost importance, for they are the fundamental points on which depend our knowledge of planetary motions and the motions of the stars themselves. The position of several hundred stars is now known with great accuracy, and for these observations we are mainly indebted to the astronomers of the Pulkowa Observatory. Previous to the present century little work had been done on double stars. Struve's work forms the real starting point of this kind of observation. In this field the observations are simple, and, although they demand great care and accuracy, they are easily reduced. The astronomer should not be discouraged because he obtains no immediate or great reward for his work, or public notice, or because some one who rants about the nebular hypothesis and kindred subjects, of which he knows nothing, is for a time the great astronomer of the day. A good observation of the smallest double star, or of the faintest comet or asteroid, is worth more than all such vague talk. The physical theories of the universe, of which modern popular science is so productive, are generally worse than useless. The determination of the parallaxes of stars is, practically, very difficult, although simple in theory; it was only about 40 years ago that the stellar parallax was measured, and then the most powerful instruments were employed. It may be generally true, as we are accustomed to think, that the stars which seem brightest are the nearest to us, but it is a fact that some of the faint stars, not visible to the naked eye, are much nearer to us than the bright stars of the northern sky. Photography, which has rendered such good service in descriptive astronomy, does not admit of the accuracy of measurement that is required for stellar work. The numerical determinations of the motions of stars toward or away from our sun are so discordant that we can have no confidence in their results. Some of the large instruments now in course of construction may throw light upon this obscure subject. In 1861 Argelander and his assistants completed their great catalogue of 324,198 stars. Work of this kind is of great value, and it should be extended to other parts of the heavens. By taking account of a great many stars it may be possible to determine the motion of the solar system in space, and also the constant of precession. There is an intimate relation between the instrument maker and the astronomer, which shows itself in many ways. The divisions on a circle or scale must not be too finely or too coarsely cut, the reading scale should be conveniently placed, and the illumination of the instrument should be carefully studied. All these are essential points, and if not properly attended to they are certain to weary the observer and to impair the quality of his work. Very few American observatories have been established for the purpose of doing scientific work, but they are generally built in connection with some college or academy, and are the product of local and temporary enthusiasm, which builds and equips an observatory and then leaves it helpless. With our present means of travel we can easily place our instruments at a hight of 8000 or 10,000 feet, thus taking them above much of the atmosphere, and avoiding the sudden changes of temperature which we have often to contend with below. At such altitudes we may be able to do with small apertures work that requires much more powerful instruments under ordinary conditions.

According to a Titusville paper, Col. E. A. L. Roberts has perfected a plan for

THE PREVENTION OF OIL TANK FIRES.

We have had occasion repeatedly to refer to these catastrophes caused by lightning, and have called attention to some of the circumstances affecting their origin. Col. Roberts proposes the use of a tank of special construction, in which no space is afforded for the accumulation of gases or air, and the oil is sealed by water. In the upper part of the tank is a diaphragm which isolates that part from the body of the tank. This space is filled with water and it is in communication with the main body of the tank by means of a pipe which descends to within a very small distance from the bottom of the latter. At first the whole tank is filled with water, and this is gradually displaced by pumping in the oil through the supply pipe, entering the main tank a little below the diaphragm. The bottom of the tank is, however, kept covered with water, into which the pipe connecting with the upper water reservoir dips. The oil is, therefore, confined within the space between the diaphragm and the lower body of water, which rises as soon as any oil is withdrawn.

A Frenchman, M. Clemandot, has been trying recently in Paris to use

GLASS WOOL FOR DIFFUSING THE ELECTRIC LIGHT,

his object being to decrease the waste usually attending the employment of ground glass. He builds up his globe, which is conical in shape, with a number of tubes placed side by side and well closed at top and bottom to exclude the dust. These tubes are filled with glass wool, spun by a peculiar process, so as to yield fibers very much finer than the finest cocoon silk. It is stated that he succeeded in reducing the absorption of light from 30 per cent. with ordinary globes to 15 per cent. by the use of his improved apparatus.

On the Corrosion of Iron and Steel and Its Prevention.

BY B. H. THWAITE, ARCHITECT.

(Concluded).

From what has already been said we see that the character of the iron itself has a decided effect on its corrosive coefficient. Therefore the points to be considered in the selection of cast iron are: 1. The amount of uncombined carbon or suspended graphite; 2. The amount of constituent carbon; 3. The degree of homogeneity, especially of the surface, as the smoother that is the slower the corrosive action; 4. The degree of density; 5. The crystalline arrangement and freedom from foreign matter.

In selecting wrought iron the chief point for consideration is its texture, as the greater the uniformity in that the less becomes the tendency to oxidation. According to Mr. Mallet's experiments, faggoted scrap iron bar, well wrought, is the most durable under all conditions. In the process of casting, the homogeneity of the cast iron depends on the cooling; if the cooling is unequal, heterogeneity will exist. The castings should also be as uniform in thickness as is consistent with the purpose for which they are intended. When soft iron is placed in immediate contact with that which is hard and dense, it has a greater chemical activity, and is positive to the denser metal which it preserves; it has also been proved by experiment that when two pieces of iron of different density have been so placed, the metal of the least density has rapidly corroded, while the denser metal has suffered very little. Saline solutions increase voltaic action; therefore the parts of iron structures exposed to both sea water and atmospheric air will suffer most at the water line. The relation that the degree of density has to the electro-chemical action influences particularly the durability of complex iron structures. In the case of cast-iron castings bolted with wrought iron or steel, the cast iron will actually corrode all round the bolt holes. This may be remedied by chilling the cast iron at the points of contact, which will increase the density, and corrosion will then take place uniformly with that of wrought iron or steel. Steel in contact with lead, gun metal, copper, brass and tin will rapidly corrode, owing to the galvanic action which is produced. An electrical non-conducting agent should always intervene between all metals of opposite electrical tendencies. For this purpose a packing of felt saturated with pitch is very suitable.

Knowing that the durability and consequent safety of engineering structures exposed to the conjoint action of all the principal elements of corrosion may be rapidly destroyed, and that the corrosion of a structure increases in proportionate ratio to the superficial metallic area exposed, it is therefore important to expose as little of the metallic structure as is possible consistent with safety. An instance of a successful application of a low ratio of exposed metallic surfaces may be cited in the Britannia Bridge. The element of strength in this bridge is the cellular arrangement of the tubes at the top and bottom. These cells are only exposed at the extreme sides and under the tubes. Thus at least one-half of the elements of strength is preserved from corrosive agents.

Air alone does not corrode iron. Therefore, by the elimination of aqueous vapor and carbonic acid from the interior of closed iron vessels, the iron is preserved. This principle can be utilized in many ways for preserving unused steam boilers by thoroughly closing all orifices, and by heat causing the aqueous vapor to evaporate. Burslyn proposes a cheap and simple method, by taking advantage of the affinity which calcium chloride has for moisture. He lays a flat, open vessel containing the calcium chloride in the iron vessel, and the air is soon freed from all moisture. As soon as the calcium chloride is saturated with moisture, it is useless and requires renewing. Water alone is also harmless in contact with iron, and if the ordinary water of commerce were evaporated in a vessel properly ar-

ranged to allow the escape of the air driven from the heated water, and then condensed before being allowed to enter the steam generator, corrosion would be almost completely retarded. This is, of course, assuming that the water was free from all injurious ingredients liable to deposit. But even with water highly charged with suspended matter in solution, it would be well purified by the preliminary evaporation and condensation.

Alloy Preservatives.—It is well known that the action of a third body, however slightly electrical, may modify catalytically the electro-chemical action of two others. This electro-chemical fact has led to the arrangement of a great number of alloys of various atomic proportions stated to be non-oxidizable, but as the nature of the reactions of such alloys upon their own oxides is not thoroughly understood, the production of the long-sought-for non-oxidizable alloy protector has not as yet been completely realized. Certain alloys, however, are said to possess great merits as electro-chemical preservers of iron. The alloy composed of 23 parts of zinc and 8 parts of copper has been proved by experience to possess a minimum factor of oxidizability, and to be a great preservative of iron and steel. The alloy proposed by M. Soriel is stated to be almost unoxidizable, equal to iron in hardness and more tenacious than soft iron. The alloy is composed of 80 per cent. of zinc, 10 per cent. of copper and 10 per cent. of iron.

Metallic Protectors.—The theory of the efficacy of metallic protectors is based on the electro-chemical relations of metals. In all rational applications of metallic protectors of iron, the former is the electro-positive, and considering that the durability of the positive protector represents the durability of the metal protected, the importance of the quality of non-oxidizability of the former is obvious. In considering the protector metal, cognizance should be taken of its electro-chemical relations to the other metals it will be placed in association with when in *situ*. Any protector metal which, in contact with other metals when in *situ*, is actually excited to the detriment of iron, should be avoided. Considerable galvanic action is excited when negative copper, in contact with positive iron, is immersed in sea water—to the great detriment of the iron; therefore copper is palpably unfit for coating iron. The same action occurs when iron is coated with lead, tin, or their alloys, which are also quite unsuited as metallic protectors of iron. According to Meyer, copper and lead exert an influence directly favorable to corrosion, and tin is especially to be avoided. When it is necessary that these alloys should be used for submarine works, it is found by experiment that common brass and the alloys of zinc and copper are more durable and less electro-negative to iron than other alloys, especially those in which tin forms the principal constituent. The coefficient of expansion of the protecter metal is one important point to be considered in examining the character of metallic protectors. The coefficients of expansion and contraction should be as near as possible alike; otherwise the coating, when subject to a sudden fluctuation of temperature, will exfoliate. Sir Humphrey Davy was the first to call attention to the electro-chemical action of zinc in respect to iron. Zinc is electro-positive to iron, and even when in simple contact has a preservative influence, but especially when in contact with the energetic medium sea water. This is instanced in the success of the method of application suggested by Mr. Weston, Admiralty chemist, for protecting marine boilers. His method consists in suspending zinc plates in various parts of the boiler in complete metallic contact with the stays and shell; thus forming, with the interior iron surface below the water line, a galvanic current. The contact complete, the zinc will necessarily distribute its protective action to all the points of contact, though, of course, in time the zinc plates will require renewing. This method is said to have been fairly successful, the greatest difficulty being the arrangement of the complete connection. Zinc was first deposited by Galvani's process of electro deposition, but this expensive method has been superseded by the deposition of the metal by mere arrangement of contact, almost identical with the process of inflating.

One of the greatest qualities of zinc is its electro-positive and passively-galvanic relation to iron. In whatever medium the two metals are placed no galvanic action is excited. One disadvantage, owing to its crystalline nature, is its liability to peel off at folds and bends. All curved portions or complete arrangements should be bent previous to immersion. The process of zinc coating or galvanizing has had a wonderful development of late years, and is now no mean element of British trade. The process has of late years fallen somewhat into disrepute, owing not so much to its own deficiencies as to the too often careless nature of the manufacturers. These cheap makers use the commonest and roughest iron sheets obtainable, and, to quicken and cheapen the process, they are pickled in exceedingly concentrated pickle. This is done to take the dross off the surface in the cheapest way, and the result is that the skin of the iron is quite destroyed. When galvanized it appears porous, and acts, of course, like a sponge, receiving in the process on its surface the condensed aqueous vapor, which at once searches for the iron, and chemical action commences. To distinguish good galvanized iron from bad the surface must be examined, when the former will be found smooth and bright, with a rich coating of metal and large and beautiful spangles, while the latter is streaky and rough, frequently having eruptions and blisters on the surface. Zinc is not so oxidizable as iron, though similar conditions are required for its promotion by both metals. Moreover, when zinc is once coated with oxide the corrosion is arrested, as the affinity between the two is so great that the transmission of oxygen to the surface under the film of oxide does not occur in the case of iron. If galvanized iron is exposed to atmospheric air at a normal temperature, its surface acquires a compact and tenacious coating of hydrated oxide, which, by the carbonic acid and watery vapor, is gradually converted into hydrated carbonate.

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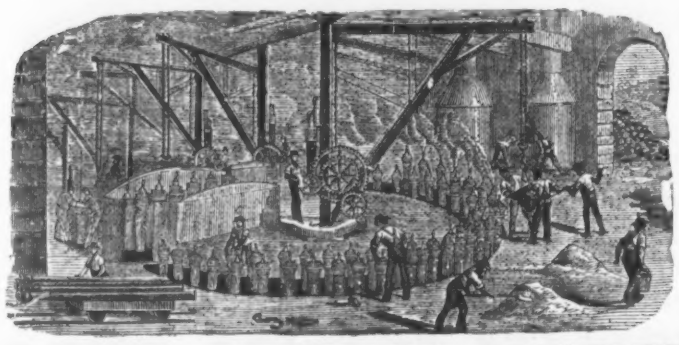

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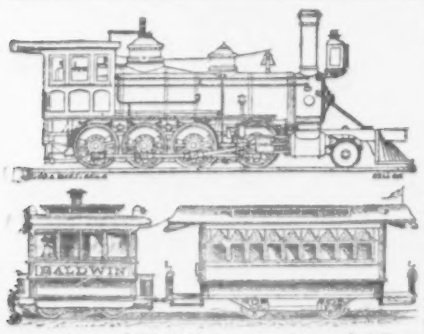

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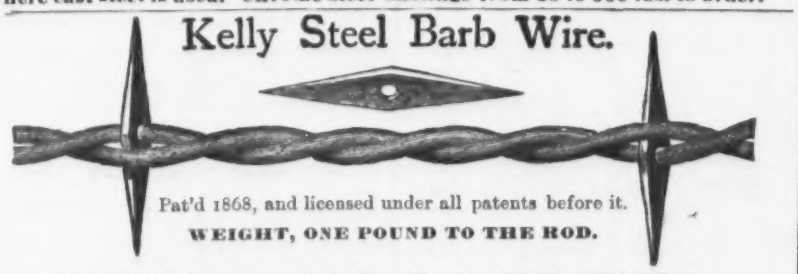

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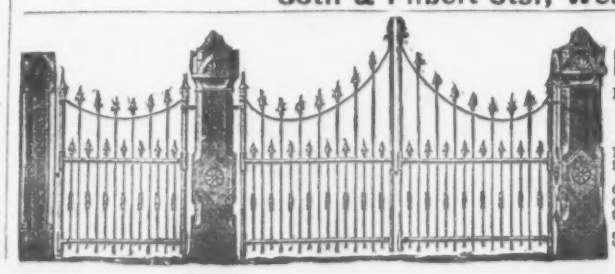

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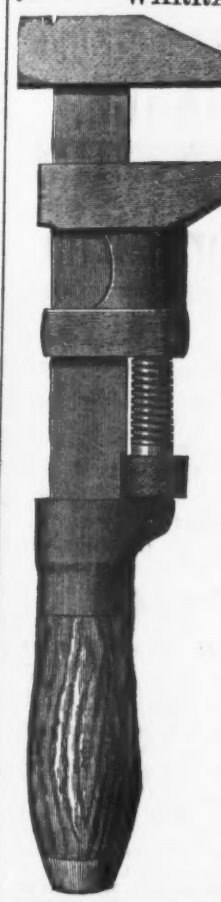

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The application of the science of electro-depositure has been largely developed of late years. Originally it was confined to the deposition of the precious metals for jewelry and art purposes. With the advance of the science of electro-metallurgy there has been a corresponding development of its application. Electro metallurgists have long sought for a metal which would resist atmospheric effects and serve as an anti-corrosive coating for iron and steel. The alloys composed of copper, zinc and a small percentage of tin—better known as German silver—were first tried, but they soon became discolored. Silver is not only too expensive, but it tarnishes very rapidly, especially the pure silver of electro-deposiure. Brass is also very liable to corrosion, owing to its its oxidizable constituents, and even if lacquered the protection is far from durable, as atmospheric influences soon destroy it. Platinum has also been tried, though with questionable success. English electro metallurgists have for many years endeavored to electro-deposit nickel, but without success, and it remained for an American—Dr. Adams, of Philadelphia—to discover the process.

Iron and steel articles should be uniformly polished before being submitted to the process, as any superficial irregularity will be fatal to the success of the application. The nickel, to have a permanent adherence, should be deposited slowly. Its color, after leaving the solution, is a proof of the success. If dull gray, it will be permanent; if brilliant and silver-like, it will seldom stand. Nickel has been proved to successfully resist the action of sea air and the atmospheric influences of manufacturing towns.

Paint.—This is the oldest and most universal form of coating, although it is often used not so much to protect iron as to enhance its appearance. The color medium is generally some earth or oxide, sulphide or carbonate of the metals, commonly lead. Owing to the peculiar action which takes place between the lead and the oleic acid of the vehicle, a curious saponification is formed, owing, according to Müller, to the quality which drying oils have of rapidly absorbing oxygen. The peculiar action of saponification unfortunately increases even after the paint is supposed to be dry and opaque, and in time the action destroys all the original opacity; the paint becomes exceedingly transparent and useless as a protector. This peculiar oleic oxidation only occurs with lead, no such action occurring with iron oxides. Lead is highly susceptible to heat, and if lead paint is exposed to a moderate temperature it blisters, while oxides of lead are equally susceptible to impure atmospheric influences; the white lead, coming in contact with sulphuretted hydrogen, turns black. Paints, however, constituted of oxide of iron never acquire the hardness that lead paints do; they are wanting in the saponification already spoken of, and they do not cover so well. For years attempts have been made to procure a zinc paint having the body and covering properties of lead. Once these properties are secured, the zinc, from its inherent qualities, is superior to lead, as well as being positive to the iron; its resistance to heat is greater, and it is far more durable than lead. Mr. T. Griffiths, of the Silicate Paint Company, London, has succeeded in discovering the long-wished-for process for using zinc in place of lead as a body. The *modus operandi* of the manufacture is as follows: Pure zinc sulphide is precipitated, and after the precipitate has been washed and dried it is calcined; then intimately mixed with sulphide of barium, and the washed precipitates are subjected to a red heat for several hours in a reverberatory furnace. To bring about the necessary quality of saponification, a small quantity of magnesia is mixed with the sulphide of zinc in the precipitating vats. According to Prof. Barff, saponification is brought about between the magnesia and oil similar to that produced by white lead and oil, though not to the same extent. This paint is very little affected by sulphuretted hydrogen, and heat sufficient to change the white lead into the yellow protoxide has no effect on the zinc paint; it will always retain its opacity. The silicate paints, owing to their silicate bases (nearly pure silica), have many excellent qualities. Their electro-neutral quality, and the high refractory and unoxidizable nature of their constituents, especially fit them as elements of assistance to protective coatings, especially in water, though it is needless to say that paint is only a short-lived protective medium, especially in an element where it is rapidly destroyed.

Very lately a peculiar protecting medium has been brought before the public notice by a company calling itself the Protector Fluid Company, who prepare the protector fluid for coating submerged surfaces, including iron. The fluid is stated to possess the following excellent qualities: Certain preservation against the corrosive action of sea or bilge water; it is smooth, durable, easily applied and dries quickly, and it prevents galvanic action. Its discovery is traced to some officers who, when surveying out in Natal, had occasion to cut a plant of the order of Euphorbia. The gum which exuded from the plant adhered tenaciously to the blades. It was, moreover, found that knives so coated with the gum did not rust. Iron plates coated with it were immersed in the waters of South Africa—proverbial for their organic impurity—and the experiments were perfectly successful. A quantity of the gum was afterward brought to England, and Sir Andrew Clarke, C. B., had a sheet of iron coated with it immersed in the Chatham dockyard. At the end of two years it was taken out and was found to be quite clean and free from fouling and corrosion. Its intensely bitter and poisonous nature paralyses the efforts of all marine animals to attach themselves to it. The gum is mixed with ordinary paint for all internal and external uses, though its acrid nature seems to suggest that it is more suitable for submarine purposes than any other. Of course, the more pure the mineral or body paints are the greater their efficiency. The commonest forms of adulteration are mixtures of chalk, sulphate of lime, barytes, &c.

Drying Oils.—When exposed to the air these oils rapidly absorb the oxygen, becoming converted into a transparent resinous varnish. Occasionally the absorption of the oxygen produces considerable heat, which phenomenon is essentially similar to ordinary combustion, carbonic acid and hydrogen both being evolved. This absorption of the oil through the minerals is the cause of the microscopic pores which exist in all parts of the paint, the number being proportionate to the affinity which the oil has for the oxygen. These microscopical pores are the cause of the slow oxidization of the painted metal which occurs, the oxygen and moisture passing through the pores to the metal. The drying property of oils is increased by heating them with various substances which promote the absorption of oxygen. The oils are heated in pans by the aid of superheated steam, and then the dryers are added, which are commonly litharge, or oxide of manganese, sulphates of zinc and magnesia. They are then allowed to boil rather smartly for an hour, after which they are considered finished. Mr. Griffiths informs the author that he prefers borates of magnesia, zinc, &c., to other dryers. This gentleman is now engaged in experimenting with a new vehicle he has invented, which he has reason to think will supersede ordinary dryers. In white lead works linseed oil is bleached by sulphuric acid, a small portion of the acid remaining in the oil. Whatever good effect this acid has in converting into sulphate any hydrate of lead that may be present in lead colors, is completely neutralized by the corrosive influence which the acid will have when placed in contact with iron and steel. For priming purposes additional substances are added to accelerate the rapidity of drying, the most effective being made from stiff boiled varnish and turpentine. This mixture occasions rapid combustion and evaporation, which, after cooling, is condensed as due upon the painted surfaces, and emulsion with the oil takes place, followed by a great loss of strength. Turpentine should always be used with caution. According to Marley, it consists of volatile oil and colophony, the latter consisting mainly of abietic anhydride or pinic acid. This acid will readily leave the weakly positive base of colophony to form salts with the basic oxides of the metals used for paints, the original organic base being thus left free to form new combinations under the influences of the atmosphere and metal. The paint thereby becomes pulverulent, and in place of preserving the iron, promotes its corrosion. Iron surfaces intended to be submerged should not be painted with boiled linseed oil paint, as it is quickly dissolved on continued immersion in water. Emulsion takes place from all solutions of oil resins, and therefore they are quite unsuitable for submerged works. For such works the vehicle which should be specified is spirit or lac varnish, as this varnish is not subject to the evil of emulsion. It should be free from all adulterations, such as tar or fatty oils, as its resisting power will depend upon its resinous contents.

Of course, the success of paint as a preservative medium for iron depends largely on the manner in which the painting is carried out. Care should be taken that the minerals are in proper proportion to the vehicles, as, if the proportions are not good, the coating, after the completion of the evaporation, will not be sufficiently thick to protect the iron surfaces, or if too thick, its coefficient of expansion will possibly differ from that of the iron, causing the paint at a moderate increase of heat to scale, split and fall off. Coal tar applied hot has long been recommended as an excellent and effective protective coating. Rankine states that Smeaton recommended it, and Mr. Mallet made several experiments to test its efficacy when laid on iron hot, and the results were highly satisfactory. Mr. Mallett describes the chemical action as follows: When coal tar is exposed to a high temperature, naphtha and other volatile matters are driven off, and the results remain on the iron in a bright and solid varnish. The above process appears to be the basis of Dr. Angus Smith's method, now commonly adopted in large pipe works for coating water pipes. The *modus operandi* is as follows: The ingredients consist of coal tar and pitch oil in the proportion of one part tar to three of oil. The mixture being heated to the boiling temperature of the oil, the castings are then immersed in the mixture and allowed to remain in it until the same temperature is diffused throughout the mass. The castings are then gently withdrawn, the naphtha and other volatile oils evaporating and draining off the castings, so that, while still very hot, a firm, hard coating of pitch is left, which firmly adheres to the casting. Care should be taken to heat the mixture to the proper degree, viz., 350° to 450° F. If it is too hot the pitch will be overheated and afterward scale off

Another method of mechanical coating lately adopted by some engineering firms in the North consists, first, of the ordinary priming and one coat of paint, which is then covered with a mixture of coach painters' patent filling and gold size, all the pores and irregularities being filled with this mixture, which is well and uniformly floated. The coating is then polished with pumice stone, and during this latter operation becomes exceedingly hard, and if well done has a pleasing enameled appearance. The pumicing has another most excellent effect, that of closing up the microscopical pores (caused by the drying oils), and the coating therefore effectually resists oxidising influences. This process can be repeated to any degree of thickness. It is obvious, however, that any great increase of temperature will cause the composition to crack. It is therefore most suitable for positions which are merely subject to ordinary variations of temperature.

The following results are deduced from a series obtained by Mr. James Princeps, of Calcutta, and published in the *Asiatic Journal*, of Bengal. They show how ineffectual some of the methods ordinarily used for protecting iron are when subjected to the severe test of foul sea water. Mr. Princeps wholly submerged a series of wrought iron plates, each 3 feet by 2 feet, in the Ganges, at Calcutta:

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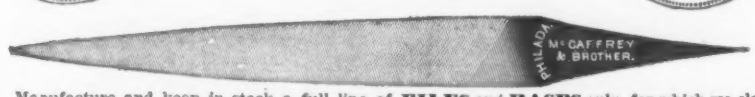

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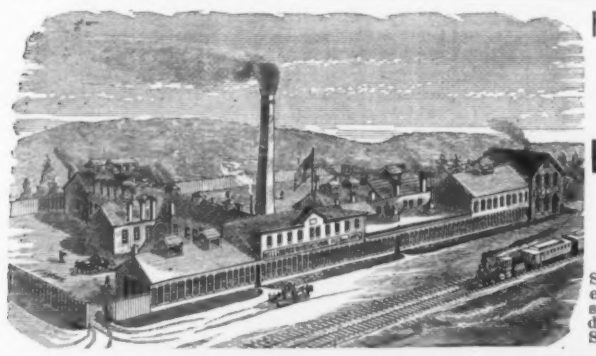

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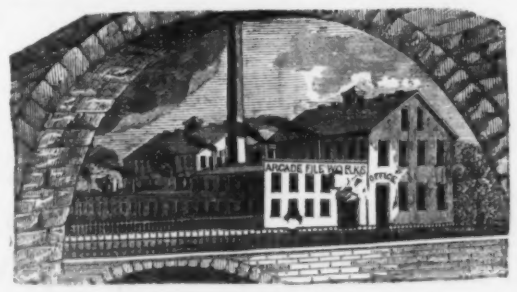

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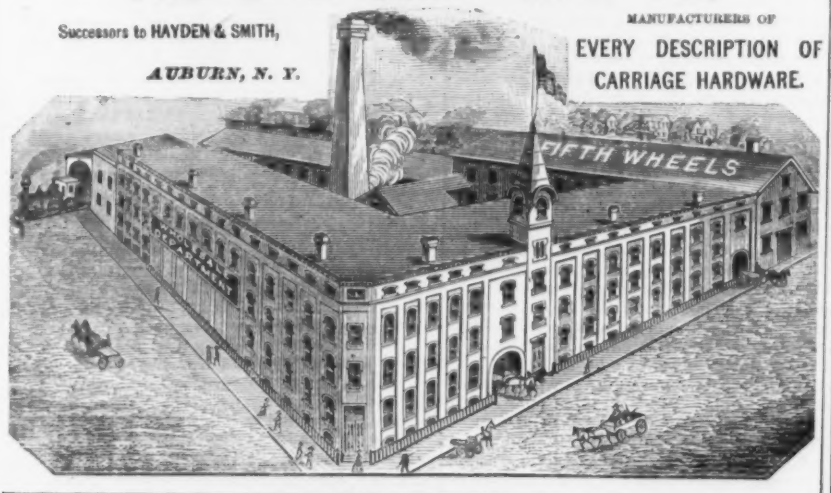

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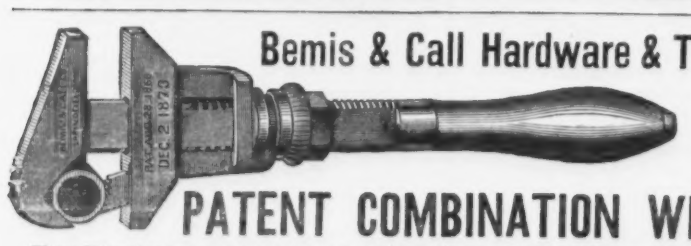

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Ginsaw,
Gulleting,
Half-Round,
Half-Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-Ender),
Handsaw Taper, single cut,
Handsaw Taper, double cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
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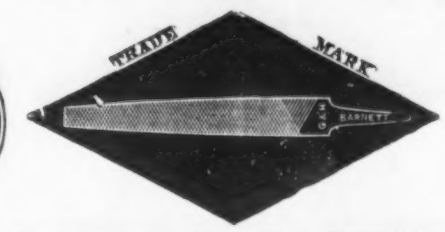

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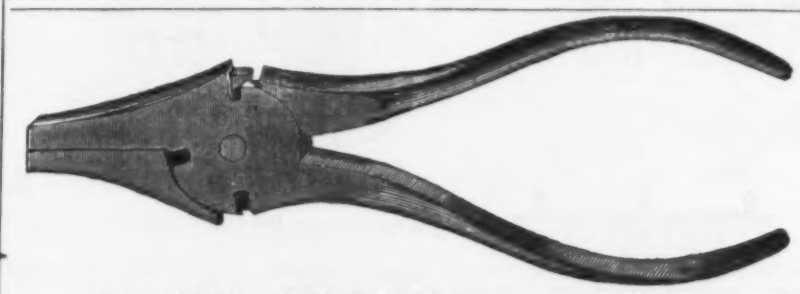

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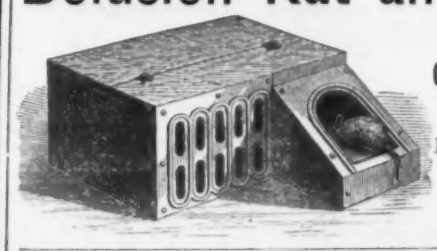

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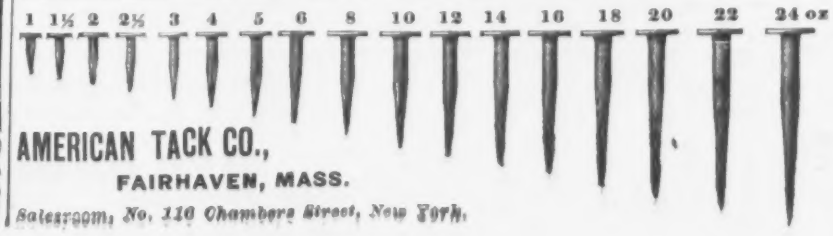

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No.	Foot of Covering.	How Applied.	Result in Three Months.
1	Coal tar.	Laid on hot plate heated.	Totally free from rust.
2	Best white lead paint.	Painted three coats, allowed to dry and harden for nearly three months.	Almost wholly disappeared. Blotches of rust on the surface.
3	Copal varnish.	Two coats dried rapidly.	Whitened, pulverulent and soft, but not much oxidated.
4	Whitewash	Pure lime water.	Flaky, peeled off and very much corroded.
5	Zinc.	An edging or guard of zinc soldered round the plate and the plate cleaned.	The clean iron exclusively corroded and bad — the zinc also oxidated.

A layer of felt saturated in coal tar or pitch should be interspersed between every layer of timber and iron, especially in sea water; and for this there are obvious mechanical reasons. If the timber begins to decay in contact with iron and sea water, the rotten wood possesses the power of decomposing sulphate of lime in sea water, reducing it to sulphuret, while the carbonic acid evolved from the decayed timber decomposes the latter, producing sulphuretted hydrogen, which rapidly corrodes the iron.

Cement Protectors.—Captain Coles recommends a coating of cement for protecting all submerged ironwork, and if the difficulty of fixing can be overcome, this remedy is doubtless a good one, as, even if it does not completely protect the iron from contact of the water, still the action of the saline and other constituents will be somewhat neutralized. It is, however, only adapted for protecting cairns and piers.

Enameling.—The process of glazing or enameling is extensively adopted for protecting and enhancing the appearance of iron. The constituents are generally silicas or alkalies, combined with metallic oxides as the coloring medium. The constituents are reduced to a fine powder and floated or painted on the surface of the castings, which are then raised in a close muffle to a temperature sufficiently high to fuse the enamel constituents, which, on cooling, adhere to the castings. To increase the fusibility of the mixture, borate of lead is often used. When water pipes are enameled the specification should insist on enamel free from any oxides of lead, as the water, and more especially pure water, will dissolve these oxides.

Enameled articles are unsuitable for positions exposed to variations of temperature, as the coefficients of enamels differ from those of the iron; consequently, any moderate increase of temperature will cause the enamel to crack, and if the slightest portion of the iron surface is exposed, the rust will gradually spread under the enamel.

Sapphire Mines in Siam.—Five years ago a native hunter in Siam found sapphires in a remote and secluded district. Some men who were let into the secret followed him to the mines, and brought back to Rangoon and Calcutta a number of very valuable stones. A rush ensued from British Burmah, thousands of adventurers flocking to the mines, some to find sudden fortune, but more to lose their lives from privation and jungle fever. The mines occur in the provinces of Battambong and Chantaboon. In his commercial report for 1879, the British Consul at Bangkok says that the miners are very careful to conceal their gems while in Siam. Being anxious to show some of the gems to Admiral Coote, the consul called for specimens from some miners who had just retuned from the diggings. One miner, a poorly-clad and miscrable-looking fellow, produced a few small stones, and, after a great deal of coaxing, was induced, with many precautions, to give a private view of his great prize, which was a very large sapphire in the rough, valued at $10,000. He would probably not have shown the stone at all had he not been on the point of leaving in a steamer. Owing to the secrecy thus observed by the possessors of valuable gems, it is impossible to give any estimate of the total value of stones found, but that individuals have made very large profits is certain. One man dug out a stone which he offered for sale in Chantaboon for $500, but did not find a purchaser. He went with it to Rangoon, where he was offered $7500, but having awakened to the value of the stone, he declined to sell, and took it to Calcutta, where he eventually obtained $15,000 for it. Now, however, there are many experienced gem merchants established in the neighborhood of the mines, and something like the real value of the stones can be obtained by the miners on the spot. The largest sapphire hitherto found, so far as the consul knows, weighed 370 carats in the rough, and when cut turned out 111 carats of the finest water. The ruby, onyx and jade are found in the district, but the quality of none of them is such as to make them very valuable.

A novel method of producing homogeneous steel has been invented by Mr. Gustaf de Laval, of Stockholm, and relates to the production of steel of more regular density when cast in an iron mold than is now usually the case. He provides the upper part of the mold with an addition or ring of refractory substance, together with a lid to fit the same. When the steel is about to be cast the ring and lid are heated to whiteness; the ring is then applied to the mold and the steel poured in, whereupon the opening is closed by the lid and the whole allowed to cool. In some cases it is desirable to accelerate the cooling of the steel by the application of cold water. The idea seems to be that the contracting metal will exert a high pressure upon the still fluid portions.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

Richard Dobbins, boiler manufacturer, Lowell, has recently filled orders for the Lawrence Co., Lowell, for 14 80-horse-power tubular boilers; also for the Boston Mfg. Co., Waltham, and one nest of Corliss boilers, 400 horse power. He is also making 3 nests of Corliss boilers for the Merrimac Mfg. Co., of 400 horse power each, and for the same company a steam pipe 20 inches in diameter and 462 feet long, and a steam pipe 15 inches in diameter and 528 feet long. Mr. Dobbins has 42 men at work and is running full time.

The Bay State Tack Company, a new organization, has erected a large two-story factory, and will start in a short time with eight tack-making machines. This will be the second manufactory of the kind in the place. There is also a large box factory, making all kinds from show cases to jewelry cases, about to start up. This will occupy the main building of what was formerly known as the Cape Cod Glass Works.

NEW YORK.

A 3-inch pipe, capable of conveying 125 barrels of oil per hour, has been laid from Bradford, Pa., to Buffalo, where an extensive refinery plant is now being planned. There are pumping stations at Cattaraugus and North Collins.

Henry Knickerbacker is preparing to place a 100-horse-power engine and boiler in the ax factory at Ballston. To supply these works for the coming year, 190 tons of English bar iron has just been imported and is now being received. Several new trip hammers are about to be added to its manufacturing facilities.

PENNSYLVANIA.

The Blandon Rolling Mill is running full time and is doing a flourishing business.

At the West Middlesex Rolling Mill the puddle and guide mills are on double turn. There is some talk about adding five new boiling furnaces.

The nickel mines at Gap, Lancaster County, are now in thrifty operation in every department, employing in the neighborhood of 175 men.

One of the Henry Clay furnaces, at Reading, went into blast on the morning of the 24th ultimo.

The furnace of the Girard Iron Company, where a fire occurred about a month ago, blew in on the 25th ultimo.

The repairs at the Leesport Furnace are progressing rapidly, and the furnace will blow in as soon as they are completed.

One of the East Penn furnaces, which blew out about six weeks ago, blew in again on Sunday, the 22d ultimo.

The employees of the Lehigh Car Manufacturing Company, about 300 in number, are busy. An order has just been received by the company for 300 box bars and 200 gondolas, for the Missouri Pacific Railroad, which will keep the works in operation all winter. Among the items in the list of material required are the following: 1000 tons of bar iron, 1200 tons of castings, 440,000 feet of white pine lumber, 830,000 feet of yellow pine, and 500,000 feet of oak.

Stack No. 3 of the Allentown Iron Company is at present being filled and will be blown in in a few days. Stack No. 5 was lit up about a week ago. Stack No. 4, which has been idle since June, is undergoing extensive repairs, and if the iron market continues firm, will be put in operation as soon as completed.

The Hollidaysburg Iron and Nail Company's rolling mill started up on Saturday, the 21st ult.

A new iron ore bed has been discovered about four miles west of Meadville, on the farm of Mr. Henry Smith. The ore is pronounced to be of a superior quality.

The superintendents of the Delaware, Lackawanna and Western Company, the Delaware and Hudson Company and the Pennsylvania Coal Company have been notified to put the mines in the Scranton district on full time after the 6th of September. The announcement has caused unbounded rejoicing among the miners, since they have been working but three days a week for the past seven months.

The Douglasville Forge of B. F. Moret is running again, having started up on the 25th ult.

The Beaver Falls Hinge Works report that they filled more orders last month than any previous month since they started.

PITTSBURGH AND VICINITY.

A large double crank is now being finished at the Duquesne Forge. The crank weighs 4 tons, and is for the steamship Awning, of Cardiff.

Work was to commence this week at the Keystone Glass House.

In regard to the outlook for the coming season among the Pittsburgh glassmen, the Pittsburgh *Chronicle* has the following: The South Side manufacturers of window, bottle and flint glass are now making extensive additions and improvements to their factories on that side of the river, which is an indication that next season will be an unusually active one and that the amounts produced will be largely in excess of any former period. As is well known, the extensive flint glass and pressed ware factory of Atterbury & Co. has been removed to an entirely new location, where extensive buildings of the latest designs have been erected. The buildings made vacant by Messrs. Atterbury were taken possession of by Messrs. George A. Macbeth & Co., who embarked in the manufacture of glass tableware. Doyle & Co. have also made extensive alterations and improvements, erecting a new office building and sample rooms. Adams & Co., during the present year, have also made extensions to their factory and erected a new office and sample room and added gas furnaces, &c. The same can be said of Duncan Sons & Co., Ditheridge Glass Company, McKee Bros. and others. At Campbell, Jones & Co.'s flint pressed tableware factory, where they have introduced the patent leer, the patent blower, gas furnace, &c., the alterations are on the most extensive scale. On the Twentieth street front the factory has been enlarged 8 feet wider, which will give more room in the interior of the factory. Campbell & Co.'s window-glass factory is also being enlarged; a great number of melting pots are being set. At Cunning-

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of

PEN AND POCKET CUTLERY,

Solid Steel Scissors, Shears, Razors, &c.

Sole proprietors of the renowned full concave

"ELECTRIC RAZORS,"

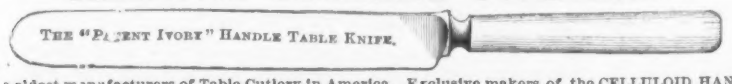
And the celebrated **"ELECTRIC SHEARS."** Nickel Plated Bows.

Agents for the BENGAL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.

91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

MERIDEN CUTLERY COMPANY.



The oldest manufacturers of Table Cutlery in America. Exclusive makers of the CELLULOID HANDLE for Table Cutlery. A most beautiful and perfect substitute for Ivory. Also makers of all kinds of TABLE, BUTCHER AND HUNTING KNIVES. Illustrated catalogues with prices sent to the trade on application. SALESROOM, **No. 49 Chambers St., N. Y.** Address all communications to West Meriden, Conn.

THE LAMSON & GOODNOW MFG. CO.

88 CHAMBERS ST N.Y.

AMERICAN TABLE CUTLERY &c.

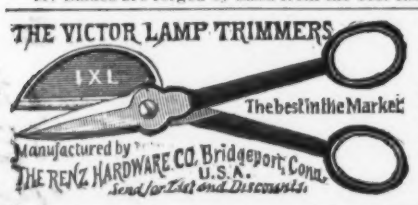
AARON BURKINSHAW, Pepperell, Mass.,

Manufacturer of

PRUNING, BUDDING AND POCKET KNIVES

OF EVERY DESCRIPTION.

My Blades are forged by hand from the best cast steel and warranted. Established 1853.



Fine Gray Iron Castings.

Fine Plain and Ornamental Metal Patterns made to order at our new foundry, Knowleton St., E. D. Address [redacted]

THE RENZ HARDWARE CO.,

Bridgeport, Conn.

JOHN WILSON'S CELEBRATED

TRADE MARK.

"FOUR PEPPERCORNS AND A DIAMOND"

GRANTED A D 1766 BY THE CORPORATION OF CUTLERS OF SHEFFIELD AND PROTECTED BY ACT OF PARLIAMENT

REGISTERED ALSO AT WASHINGTON U.S.A. ACCORDING TO ACT OF CONGRESS

ALSO AT LEIPZIG, IN ACCORDANCE WITH THE GERMAN TRADE MARKS' REGISTRATION ACT.

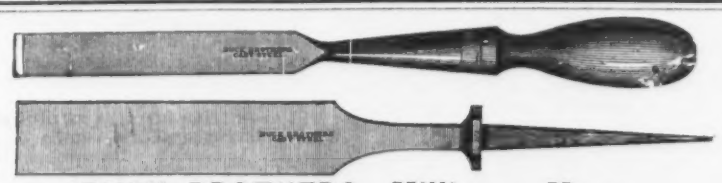
BUTCHERS' KNIVES, BUTCHERS' STEELS, AND SHOE KNIVES.

It having come to the knowledge of JOHN WILSON that Counterfeit Butchers' Knives, purporting to be of his manufacture, are being sold in the United States, he hereby cautions all purchasers of his Knives and Steels to be on the alert against such imposition.

JOHN WILSON also hereby gives Notice, that it is his determination to institute Legal Proceedings against any person or persons who may be detected infringing his Trade Mark.

☞ Every article of JOHN WILSON'S manufacture, bears the Trade Mark, in addition to the Name.

WORKS:—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.



BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of

Shank, Socket Firmer and Socket Framing Chisels,

PLANE IRONS.

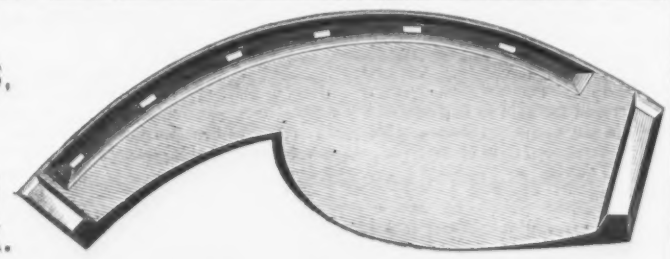
CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons, who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark, also "Riverlin Works."

FINISHED

Ox Shoes,

WITH

Steel Converted Toe Calk.



IVES, WOODRUFF & CO., Manufacturers,

MOUNT CARMEL, CONN.

G. W. Bradley's Edge Tools.

Butchers' Cleavers,
Butchers' Choppers,
Axes and Hatchets,
Grub Hoes and Mattocks,
Mill Picks,
Box Chisels and Scrapers,
Ring Bush Hooks,
Ax Eye Bush Hooks,
Socket Bush Hooks,
Watt's Ship Carpenters' Tools,
Carpenters' Drawing Knives,
Coopers' and Turpentine Tools.

FOR SALE BY

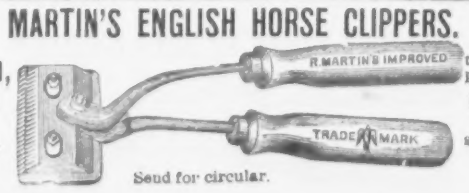
MARTIN DOSCHER, Agent, 85 Chambers Street, N. Y.

MARTIN'S ENGLISH HORSE CLIPPERS.

J. J. Shannon,

1707 Market St.,

PHILADELPHIA.



Send for circular.

Recommended as the best Hand Clipper made.

$3.00 EACH.

Extra pieces for sale.

Cutlery.

ALFRED H. HILDICK,

12 Warren St., N. Y.,

Importer of **CHAINS, ANVILS, VISES, &c.**

Agency of

HILL BROTHERS & CO., WALSALL, ENGLAND

GENERAL HARDWARE MERCHANTS,

And of

BALL'S PAT. SOLID STEEL SHEEP SHEARS.

These shears are unsurpassed for cheapness, durability and utility. They are made of one solid piece of steel from point to point, and cannot be broken in use either in the bow or at the junction of the shank and blade. Samples can be seen at above address, or sample lots furnished.

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Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for **Joseph Rodgers & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

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ESTABLISHED 1836.

Alfred Field & Co.,

COMMISSION MERCHANTS,

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Guns and Pocket Cutlery,

SPECIALTIES.

Headquarters for

ELEYS BROS.' GOODS, WRIGHT'S ANVILS,
WILSON'S BUTCHER KNIVES, &c.
WOSTENHOLM'S POCKET CUTLERY AND RAZORS.
BUTCHER'S FILES, TOOLS AND RAZORS,
STUBS' FILES, WESTERN FILES,
GREAVES' SHEEP SHEARS,
CHESTERMAN'S TAPES,
GERMAN COIL AND HALTERS and other CHAINS,
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Etc., Etc., Etc., Etc.

All sorts of Hardware and Merchandise for import and export purchased on commission.

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MANUFACTURERS OF THE CELEBRATED

Kangaroo Sheep Shears,

The best Shears made.

Every Shears Guaranteed.

ALFRED FIELD & CO.,

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Send for price list and terms.

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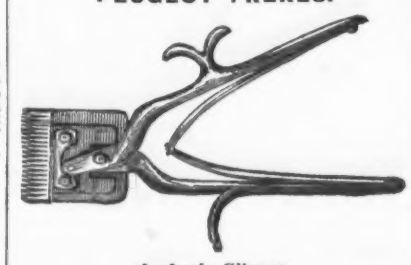
PEUGEOT FRERES.



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We are sole agents for these Clippers. All orders should be addressed to us to obtain lowest prices.

McCOY & SANDERS,

132 Duane St., New York.

Horse Clipper.

Silver Medal, 1878—Paris.

J. R. SPENCER & SON,

Albion Steel Works, Sheffield,

MANUFACTURERS OF

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STEEL,

Table Knives, Razors, Shovels, &c., &c., of every description.

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SPENCER SHEFFIELD

Granted 1749.

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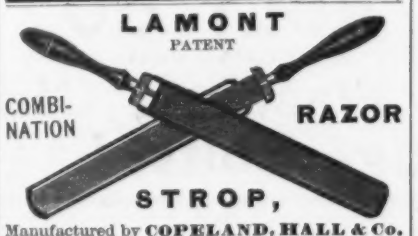
PATENT

COMBINATION RAZOR



STROP,

Manufactured by **COPELAND, HALL & Co.**, *Rochester, N. Y.*

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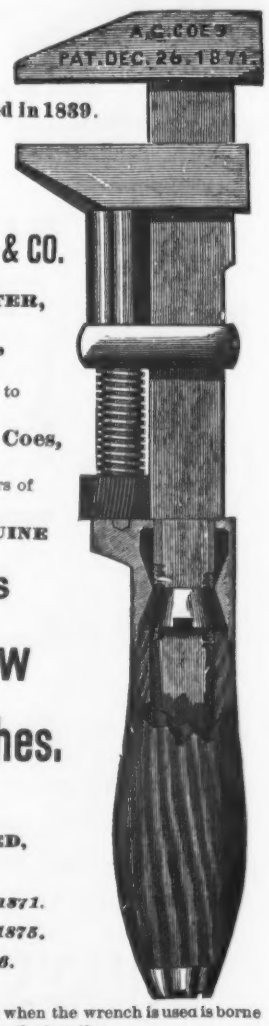
Established in 1839.



A. G. COES & CO.

WORCESTER,

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Successors to

L. & A. G. Coes,

Manufacturers of

THE GENUINE

COES

Screw Wrenches.

PATENTED,

May 9, 1871.
December 26, 1871.
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The backstrain when the wrench is used is borne by the bar—not by the handle.

The strongest Wrench made, and the only successful Re-enforced Bar.

None genuine unless stamped

A. G. COES & CO.,

Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

CLOTHES WRINGERS.

Self-Adjusting Steel Elliptic Spring.

T. J. ALEXANDER, Manager,

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Romer & Co.

Established 1837.

Manufacturers of Patent Scandinavian or Jail Locks, Brass Pad Locks for Railroads and Switches. Also Patent Stationary R. R. Car Door Locks.

HANDCUFFS AND LANTERNS.

141 to 145 Railroad Avenue, NEWARK, N. J.

Illustrated Catalogue sent to the trade on application.

Lemon Squeezer

Far excels any that has ever been made; occupying but little space: useful and ornamental. **A box of Lemons can be squeezed in Twenty Minutes,** breaking all the cells of the lemon and extracting all the juice. There has never been a Lemon Squeezer made that can do what this one can.

ROBERT ONDERDONK, Sole Manufacturer,

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"DRAW CUT"

BUTCHERS' MACHINES.

Choppers, Hand and Power

Stuffers,

Lard Presses.

Warranted thoroughly made and the BEST IN USE.

MURRAY IRON WORKS,

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Measuring Tapes

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FOR ALL PURPOSES.

351 to 353 Classon Ave., Brooklyn, N. Y

CHAS. E. LITTLE,

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Pump-Log and Tubing Augers and Fittings,

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THE MERIT OF

MARTIN'S PATENT CASTER

SECURES STEADILY INCREASING SALES.

GIVE US SAMPLE ORDER AND YOU WILL BE THEIR FAST FRIEND.

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PHOENIX CASTER CO.,

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Send for Circular and Discounts to the Trade.

Wrought Iron Adjustable Stove Truck,

—MANUFACTURED BY—

TUCKER ALARM TILL CO., Indianapolis, Ind.

MOUNTED: One end on Martin's Patent Caster—the other on rigid wheel. Runs straight in narrow isle.

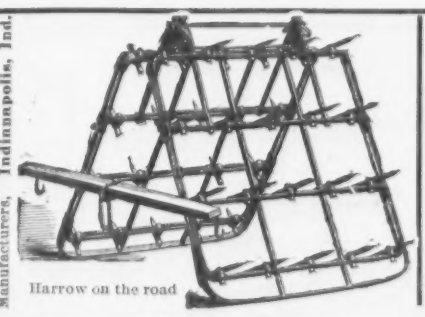
ONLY ONE SIZE FOR ALL STOVES.

Retail Price, $2.75.

Packed Six in a Case. Painted Black.

Patented February 13, 1872; October 1, 1878; July 1, 1879; December 30, 1879; July 6, 1880.

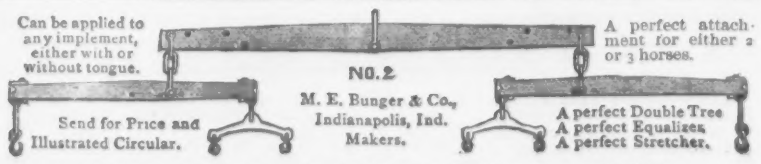
Rogers' Duplex Harrow.
M. E. BUNGER & CO.,
Manufacturers, Indianapolis, Ind.



Harrow on the road

We make Till either for Coin or Scrip.

Can be applied to any implement, either with or without tongue.



A perfect attachment for either 2 or 3 horses.

Send for Price and Illustrated Circular.

NO. 2

M. E. Bunger & Co., Indianapolis, Ind. Makers.

A perfect Double Tree
A perfect Equalizer,
A perfect Stretcher.

The best selling implement in America Just the thing for fall plowing

ham & Co.'s bottle and window-glass works an additional factory has been erected to the four factories of that enterprising firm.

The well-known firm of Lewis, Oliver & Phillips, which has been engaged in the manufacture of iron at Pittsburgh since 1866, has been dissolved, Mr. Wm. J. Lewis retiring. The new firm, Messrs. Oliver Bros. & Phillips, composed of Mr. Henry W. Oliver, Jr., David B. Oliver, James B. Oliver, John Phillips and James Smith, will continue the business, which has grown to wonderful proportions. Mr. James Smith, we are pleased to note, is now a member of the new firm. He has been connected with the old firm since its foundation, and is well known to the entire business community.—*Bulletin.*

OHIO.

The Massillon Rolling Mill, recently purchased by Mr. Corns, was to have fired up last Saturday.

The Mary Furnace, at Lowellville, is having two new flue boilers and a new bell and hopper added. The company expect to put in a new hot-blast in the fall.

Grace No. 2 and Tod furnaces of the Brier Hill Iron and Coal Co., Youngstown, are both in blast. Grace No. 1, which is being rebuilt, will go in soon.

Mt. Vernon Furnace has put out 4000 tons this year, and the manager thinks he can make it amount to 6000 before the close of the year.

The new Nicholson Furnace of the La Belle Glass Works, at Bridgeport, is operating very well, and the works are running full.

Olive Furnace has been shut down for repairs.

The stockholders of the Buckeye Glass Works were in session on the 24th ult., and after a free discussion, it was decided to appoint an assignee. Mr. H. W. Smith received the appointment. The works will probably be sold. The stockholders will not lose more than 25 cents on the dollar. The works will shut down temporarily.

The Alice Furnace, at Ironton, commonly known as "big Ætna," is doing very well. The week before last she turned out 349 tons.

All of the Bellaire glass works are in operation, except the window glass works.

The *Register and Tribune*, of Youngstown, prints a list of subscribers to a fund of $100,000, to be raised for transferring the agricultural works of Wm. Anson Wood & Co. from Albany, N. Y., to that city. The subscriptions thus far amount to $87,050, and it is expected that the rest will be rapidly made up, as a portion has been already pledged.

WEST VIRGINIA.

The Top Mill Furnace will go into blast about the middle of October.

The La Belle Mill, at Wheeling, is running on about half time. Most of the other mills are running full.

At the North Wheeling Glass Works glass is being made in the new ten-pot furnace, and Southern and Western shipments will soon begin.

MICHIGAN.

The Deer Lake Furnace has been purchased by Messrs. E. R. Hall and W. H. Rood, and will soon be blown in.

The following table, from the Marquette *Mining Journal*, exhibits, in gross tons, the total lake shipments of ore this season, up to and including August 18, together with the amount shipped during the corresponding period last year:

Where from.	1879.	1880.
Escanaba	362,272	668,290
Marquette	323,404	396,793
L'Anse	22,848	30,389
Total	708,524	1,095,472

Showing an increase of 386,948 gross tons.

ILLINOIS.

The Crane Bros. Mfg. Co. are erecting an extensive building, to be used as a branch of their present manufactory in Chicago. Here they will manufacture hoisting machinery, &c. They are running nearly 800 men full time. This new addition was necessitated by the increased demand for goods of their production.

The Chicago Steel Works, after making several important additions to their extensive establishment, will soon resume work with over 100 men on their pay rolls Their capacity will be over 5000 tons of manufactured steel per annum.

James Hogg, proprietor of the Chicago Die and Machine Works, is running a force of over 20 men full time, and has all he can attend to in the line of barb-wire machinery, dies, presses, &c.

Willards' Sons & Bell, manufacturers of car axles, steamboat shafting, &c., have completed the additions to their works begun some time ago, and are once more running full time with orders far ahead.—*Chicago Journal of Commerce.*

MISSOURI.

The Laclede Rolling Mills are running full time on an order for sheet iron for the boilers of a new blast furnace being constructed at Cowan, Tenn.

Two steam cylinders for the Taylor press of the St. Louis Cotton Compress Company, 64 inches in diameter by 10 feet long, weighing 14 tons each, were successfully cast at Timmerman's Iron Works this week. This press will have the nominal power of 1500 tons pressure, but can be worked to 2000 tons.—*Age of Steel.*

The Helmbacher Forge and Iron Company recently completed the forging of a shaft 30 feet long and weighing 10 tons. The shaft is a fine piece of work, and is intended for the large towboat John Gilmore.

The French Window Glass Works, at St. Louis, will start up in a few days, repairs being almost completed.

NEW JERSEY.

The following will show the total number of locomotives turned out at all the shops of Paterson in the first six months of the years 1879 and 1880, which will serve for a comparison:

	1879.	1880.
January	13	13
February	13	16
March	14	8
April	8	21
May	4	24
June	20	29
Total	[illegible]	111

KENTUCKY.

The Louisville Car Wheel and Railway Supply Co., of Louisville, have just closed a contract with the Louisville and Nashville Railroad Co. for all the car wheels required by the Louisville and Nashville Railroad system for the year 1881, estimated at from 30,000 to 40,000 wheels. This will require from 7500 to 10,000 tons of metal, for which the Car Wheel Co. have also closed contracts, taking the old wheels necessary for the same from the Louisville and Nashville Railroad Co., and the pig iron exclusively of the Red River, Woodstock, Dover, Hecla and Buckhorn brands. These are five of the best car-wheel irons made in the country.

CALIFORNIA.

The preparations for erecting the rolling mills of the Central Pacific at Sacramento are now in active progress. The site for the building, which is immediately by the side of the Overland track, and south of the copper shop, has been cleared and staked off for the foundation. Pile-driving for the foundation has commenced. When this work is completed the brick foundation for the building will be laid. The building will be 80 by 180 feet, with a lean-to addition for boiler house, &c., 20 feet wide and running the entire length. This will make the building 100 by 180 feet. The posts or sides of the building will be 30 feet in hight, and the bridge 53 feet from the ground. The roof will be of corrugated iron, similar to the depot, and have an area of over 22,000 square feet. The engine being constructed at the shops for these works will be of 800-horse power. It will be a vertical engine, with cylinders 32 inches in diameter and 36 inch stroke. It is expected there will be six furnaces, with a boiler for each, to run the engine and the immense steam hammer, which will weigh about 10,000 pounds. The anvil-block, or bed upon which it is to play, will weigh about 25 tons. A crane for use at the hammer will be of sufficient strength to carry from 25 to 30 tons. It is not yet determined whether this will be operated by hydraulic power or other method. The purpose of the rolling mills is to eventually manufacture everything in the line of iron and steel used by the railroad company, which will largely increase the number of its employees and the importance of its works in Sacramento.

LABOR AND WAGES.

On the 24th ult. a committee of the Molders' Union waited on President Sprague, of the Ohio Falls Car Works, Jeffersonville, Ind., to learn upon what conditions the striking molders could return to work. Mr. Sprague declined to treat with them as a committee of the Molders' Union, but stated to them individually upon what terms some of the strikers could resume their old positions. The company had selected from their vigorous and ambitious employees about thirty young men who were being initiated as molders. The success of this experiment, after a week's trial, surprised the officers of the company. These novices were to be retained. The old molders, while in the future employ of the company, were to withdraw from all connection with the Molders' Union and have nothing to do with it; to pledge themselves not to engage in any strike, and not to interfere in any way with the company in its management of the foundry. The leaders of the strike, and those actively engaged in intimidating new comers, were not to be allowed to return to work. The molders were not to be received back in a body, but each one was to make his individual application for re-employment. The committee reported to their union at a stormy session on the afternoon of the 25th ult. Directly after the adjournment of this meeting so many of the molders assented to the conditions of the company and applied for work that to-day the company, with its new recruits and returned strikers, have more molders on their hands than they can find work for. As the result of this action, it is supposed that the Molders' Union at Jeffersonville will surrender its charter and cease to exist.

From Wheeling, under date of August 28, we learn that the shove-unders and drag-outs refused to subscribe to the scale submitted by Vice-President Rodgers, of the Amalgamated Association, and quit work Thursday evening. By their action they have forfeited the protection of the association, and also their jobs, and new men will replace them.

The employees of the Allentown Rolling Mill struck on August 29th against a reduction of wages.

Milwaukee, Wis., was greatly excited on the 25th ult. by a strike of the mechanics employed by the Chicago and St. Paul Railway Company. About 400 men have gone out of the new machine shops, and the locomotive works, which cover a large portion of the Menominee valley, are idle, with 20 engines and much other work unfinished. It is one of the most important labor movements ever inaugurated in the West, and the result of it will have a strong bearing upon manufacturing generally.

The strike of the coal miners at Coalton, near Judson, Ohio, on the 27th ult., was caused by new men being brought to work. The old miners threatened them with death if they went to work, and also made them promise to leave the country at once. No lives have been lost so far. Gov. Foster was telegraphed for troops. Yesterday at midnight the new men's boarding houses were surrounded by 100 masked men. The sheriff and a force are on the grounds. The operators have arrived and are guarding their property, and the militia are looked for every train. Unless troops arrive soon serious riots are feared.

The "warming-in" boys at Beatty's Glass Works, Steubenville, Ohio, struck on the 25th ult. for higher wages. They have been paid five cents per 100, and they demanded that a change be made, and that they be paid by the turn. A turn has been six hours labor, and the boys ask for 55 cents. About 100 boys are employed in the "warming-in" department. An effort is being made to-day to supply their places with new boys.

The Cincinnati stove molders' strike ended on the 27th ult. by the men in Davis' shop going to work. The strike lasted 17 weeks, and was for 10 per cent. advance. Davis & Co. conceded this, but refused to

discharge the non-union men. The matter was finally compromised by placing the non-unionists in a colony shop. This factory is the largest in the West, and regulates others in this section.

METALLURGICAL NOTES.

AN OLD PROCESS REVIVED.

As a curious instance of the vitality of patent processes, we would cite one which has come under our notice recently. Many of our readers will remember the Ellershausen process which created such a sensation in metallurgical circles years ago, failed in a disastrous manner and was then lost sight of. From time to time it has cropped up in various countries until now it has reached Austria, where it has found an able and a critical advocate in Prof. von Ehrenwerth, who believes that the principles upon which it is founded are capable of being realized in practice. From an examination of the record of the work done by Ellershausen, he concludes that it is an important point to use white pig when mixing with ore in manufacturing the ore blooms. The latter he would use as a raw material in the open-hearth furnace, and Herr von Ehrenwerth states that an Austrian firm are now making steel on this plan. They produce ore blooms by a process still kept a secret, and add the product in a Seimens-Martin furnace. Important circumstances to be taken into consideration are that the ore used must be as free as possible from silica, and is best when calcareous. Herr Ehrenwerth even suggests the addition of lime as a flux, and the use of a basic lining for the furnace.

DRYING THE AIR FOR METALLURGICAL FURNACES.

Every furnace manager has been taught by experience how considerably the working of his furnace is affected by the state of the weather, and notably by the amount of moisture in the atmosphere. According to *Iron*, Mr. W. H. Fryer, of Coleford, Gloucester, has determined this cause of irregularity and expense by drying, or "dessicating," the air previous to its being blown into the blast furnace, Bessemer converter, &c., as the case may happen to be. In practice, the air to be forced into the furnace or Bessemer converter is passed over sulphuric acid or chloride of calcium, so as to deprive the air of the vapor of water contained in it. The dessicating material is disposed in a chamber through which the air is passed, the particular arrangement depending upon the nature of the material employed (whether solid or liquid) and its dessicating and other properties, the essential conditions of the arrangement being that the dessicating material shall expose a large surface to the air, and that the capacity of the chamber shall be such that the air will travel through it at a sufficiently slow rate to insure the thorough action of the dessicating material upon it.

THE COMPRESSION OF STEEL.

The Jones method of compressing steel ingots by means of high pressure steam continues to be the subject of much discussion abroad. The *Engineer* has the following: "Mr. Davis contemplates the use of air; but the cost of a compression plant will be very much greater than that of a boiler. The great charm of Mr. Jones's system is its cheapness and simplicity. The moment we depart from the use of steam and adopt compressed air in its stead, complications and difficulties and expense will be incurred. In pursuit of simplicity, Dr. Siemens, we believe, tried to inject water on the top of the ingot in the mold, beneath, of course, a closed lid, and, if we are not mistaken, Mr. Jones tried the same device. In each case explosions resulted, as might have been expected. But the moment it has been proved that pressure will give solid ingots, no matter how that pressure is applied, various devices may be used to secure the required end.

"To us by far the most promising scheme seems to be the following: Let each ingot mold be made with a tight-fitting lid which can be readily and quickly put on. Then, as soon as the mold has been filled, let a measured quantity of some gas-producing material be thrown in on the top of the fluid steel and the lid put on. It would be by no means difficult to scheme a safety valve arrangement, if such a thing were necessary, which it is not. A very few experiments would suffice to determine the quantity of gas-producing material to be used and its nature. We may suggest one or two. Nitrate of soda and clay made into a cake would give off gas slowly; oil worked up with clay would have the same effect. Even common coal coated with clay by dipping it in a thick 'slip,' would probably answer the purpose thoroughly. Roughly speaking, coal will give off about 250 times its own volume of gas at atmospheric pressure. At the temperature of molten steel its volume would be probably about 1500 times that of the coal. If there were no leaks in the mold a cubic inch of coal would be ample to give a pressure of some 300 pounds or so on the square inch. The clay in all cases serves the purpose of keeping the gas-producing material cool for a few seconds until the lid can be put on the mold. The process would be to the last degree simple and inexpensive. It would suffice to throw into each mold, as we have said, a pellet of gas-producing composition, enveloped in clay, and to put on and secure the lid; no costly apparatus of any kind would be needed. The scheme is not patented, and it is open to the whole world to try it. It is also worth while to consider whether the adoption of some method of agitating the mold, as by letting it drop vertically and suddenly, though a few inches, just before consolidation begins, might not operate powerfully to disengage gas, without any other agency whatever."

In reference to these suggestions by the *Engineer*, we may be permitted to state that the idea of using slowly-burning powder for producing the pressure was suggested, and, if we are not mistaken, tried at one of our large steel works. A patent covering this was taken out in this country in 1867 by M. Antoine Galy-Cazalet, of Paris, from whose agent, Mr. James Henderson, we receive the following data relating to it: The patent specifies the use of charcoal 20 parts, and saltpetre 80 parts, and no sulphur, and is applied to the liquid metal in the mold. The head of the mold is covered by a metallic cap and attached by bolts or other devices; a vertical pipe is fitted in the center of the cap, and is provided with a cock at its lower extremity; the mixture is charged through this upon the liquid metal, and the pipe is closed. One-quarter ounce of the mixture gives pressure equal to a head of 90 feet of metal, if the space between the cap and metal is 1 inch and the capacity is 30 cubic inches, which is about equal to the force of a hammer of 10,000 pounds falling 4½ feet upon the area of 30 square inches. The pressure may be increased to any desired extent up to 15 tons per square inch by increasing the quantity of the mixture. The materials are merely mechanically mixed when required for use, and there is no chemical combination until they are ignited by the liquid steel, when they burn slowly without explosion, as there is no sulphur, and consequently no risk in using it.

THE CHEMICAL REACTIONS DURING THE BASIC PROCESS.

Prof. Kupelwieser, of Leoben, who was one of a commission of Austrian experts appointed to report upon the working of the basic process at Hoerde and Ruhrort, has published some additional data and some speculations on the latter. To our readers the results of analyses will probably be of greater interest. Eleven samples of metal and cinder were taken during one blow at the Ruhrort works, the charge consisting of 3000 kilograms of Ilsede pig, 500 of Hollerich (Luxemburg) metal, and 2500 kilograms of Ormesby pig. The additions were 300 kilograms of Gute Hoffnungshuette spiegel, averaging 12 per cent. of manganese, and 40 kilograms of ferromanganese, averaging 50 per cent.; 1080 kilograms of burnt lime were added during the blow, which yielded 5597 kilograms of steel and 975 kilograms of cinder. The following table gives the results of the analyses taken at the intervals stated:

Number.	Time after beginning. Min.	Sec.	Sulph.	Silicon.	Phos.
Pig	.....	.....	0.055	1.343	2.094
I	1	11	0.054	0.780	2.097
II	3	46	0.105	0.201	2.392
III	6	30	0.064*	0.107	2.255
IV	9	10	0.100	0.039	2.149
V	11	53	0.078	.....	2.126
VI	13	38	0.062	0.043*	1.956
VII. (blow over)	17	39	0.251*	0.025	0.231
VIII. (blow over)	18	36	0.134	0.014	0.140
IX. (blow over)	18	50	0.112	0.019	0.081

*Doubtful. Quantity of substance too small.

The samples of cinder taken at the various periods of the blow were found to contain, by analyses, the following:

Number.	Time. Min.	Sec.	Sulphur.	Silica.	Phos. acid.	Iron.
Pig	.....	.....	0.392	41.060	1.627	5.128
I	1	11	0.076	14.540	11.776	13.419
II	3	46	0.201	41.470	0.845	2.698
III	6	30	0.128	28.760	4.658	16.640
IV	9	10	0.676	34.580	3.378	3.692
V	11	53	0.051	31.170	4.632	5.751
VI	13	38	0.082	16.690	10.973	8.946
VII	17	39	0.042	13.340	12.165	7.384
VIII	18	36	0.045	12.230	16.475	8.094
IX	18	50	0.067	11.960	17.012	8.520

It is evident from the composition of the cinders of Nos. 1 and 3 that they were not fair averages.

An examination of the figures for the metal clearly shows the very important point that the sulphur is not eliminated; that, on the contrary, so far as this single case goes, the proportion in the metal is actually increased. Considering that even the most enthusiastic supporters of the basic process have only claimed an elimination of little more than 50 per cent., the statement that the sulphur now may loom up as a *bête noir* in many instances will not appear exaggerated. The silicon, it will be noted, declines very rapidly during the early part of the blow. The course of the phosphorus is striking. A slight increase takes place until No. 2, when the decline is constant, but small, until No. 7 is reached. During the period of overblow which follows, the elimination is exceedingly rapid and sudden.

Leaving out of consideration Nos. 1 and 3, it is evident that the cinder loses some of its sulphur during the blow. The contents of silica gradually decrease from 41 to almost 12 per cent., and the phosphoric acid simultaneously increases from 1.6 to 17 per cent., while the iron, after some fluctuations, reaches 8.5 per cent.

Major Pickands seems determined to wear the laurels for superior work in a charcoal furnace. The *Journal of Charcoal Iron-workers* prints the following extracts from his annual report of the operation of Bangor Furnace, Michigan; size, 43 x 110 feet:

RECORD OF BANGOR FURNACE FOR 12 MONTHS ENDING JUNE 30, 1880.

Tons of ore smelte	24,596.3
Bushels of coal consumed (2748 cubic inches)	1,458,350
Tons of limestone flux used	841
Gross tons of pig iron made	14,653½
Charges run	58,334
Bushels of coal used per ton of iron made	99.52
Average yield of ore, per cent	59.57
Pounds of flux per ton of iron	134
Average burden carried, lbs	940
Cubic feet of air used per ton of iron	154,812
Pounds of air per pound of iron	2.78
Number of days run	352.3
Average daily product, gross tons	41.54
Number of days run on this blast	189.3
Tons of iron made on this blast	15,753½

Furnace still in and averaging 43 tons daily. Best week's work, 356 gross tons. There are a number of unusual points in this record. The amount of iron made, low fuel consumption (about 2000 pounds charcoal per ton of iron), small quantity of flux required, and the remarkable richness of the ores, are among these. But the most surprising is the very small amount of air taken—about 52 cubic feet per pound of charcoal. This is less than any record we have ever seen. The blast is heated in iron pipe stoves, and probably averages 850° F.

We are surprised to find in the *Engineer* the following significant statement: "It is well known that to get from Sheffield firms a cast-steel pinion without holes in which the end of a pencil can easily be put, if not the finger, is very difficult indeed."

The Iron Age

AND

Metallurgical Review.

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It is announced by cable that the House of Lords has passed an amendment to the Employers' Liability bill which virtually destroys the intent of that measure, now about to become a law. The amendment provided for the omission of that section of the bill entitling claims to be preferred against an employer in case of injury caused by the negligence of any of his servants. The subject was one requiring the most delicate treatment, and, as we noted some time since, the bill was not framed in such a manner as to give any guarantees against excessive litigation, fraud and many attendant evils likely to embarrass employers. Until employees have given evidence of a determination to go to the root of the evil in many cases by first enforcing the exercise of ordinary prudence among themselves, their efforts at reform will be viewed with suspicion and distrust. Any attempt to saddle employers with a liability which is not extended also to fellow workmen is one-sided and unjust, and injures a cause which will otherwise be regarded with favor by all well-meaning and conscientious employers.

The Food Question in Europe.

Crop accounts from Europe are promising, with the sole exception of Germany and Russia. In Germany the rye yield will be deficient, and in Southern Russia that of wheat. Stocks have, however, run very low everywhere, and for a couple of months American wheat and other cereals will have to be resorted to. Meanwhile our crops will, in all likelihood, come up to the average of the last two years. Our exports during the past ten years has increased as follows, as compared with the previous ten years:

	Wheat, bush.	Flour, bbls.	Indian corn, bush.	Corn-meal, bbls.
1860-69..	188,000,000	30,361,000	103,000,000	2,478,900
1870-79..	549,000,000	37,118,000	438,000,000	3,422,000

While, therefore, the export of wheat increased 192 per cent., that of Indian corn increased 325 per cent. On the other hand, flour exportation increased only 22 per cent., and that of corn meal 38 per cent.

The following table shows the entire production and export during the past ten years:

Fiscal year.	Wheat. Production — Millions of bushels.	Wheat. Exports — Millions of bushels.	Flour. — Export, thousands barrels.	Indian corn. Production — Millions of bushels.	Indian corn. Exports — Millions of bushels.	Corn-meal. — Export, thousands of barrels.
1870.....	260	37	3,463	$74	1	187
1871.....	236	34	3,654	1,094	10	212
1872.....	231	26	2,515	992	34	309
1873.....	250	39	2,562	1,093	39	403
1874.....	281	71	4,094	932	34	388
1875.....	308	53	3,973	850	29	292
1876.....	202	55	3,936	1,321	49	354
1877.....	289	40	3,344	1,283	71	448
1878.....	364	72	3,947	1,343	85	432
1879.....	420	122	5,630	1,388	86	397
	2,931	549	37,118	11,170	438	3,422
1860-69.. 11 mos.	....	188	30,361	....	103	2,478
1879...	....	114	5,203	....	75	363
1880...	....	139	5,538	....	83	309

In order to show the actual export during the first eleven months of the fiscal year ended June 30, 1880, we have extracted all domestic food produce from export tables furnished by the Bureau of Statistics, including breadstuffs. We have reduced values to thousands of dollars:

DOMESTIC EXPORTS FOR 12 MONTHS.

Articles.	Quantities. 1880.	Quantities. 1879.	Values. 1880.	Values. 1879.
Hogs.....	72,160	68,120	$348	$644
Cattle.....	159,552	118,424	11,157	7,349
Sheep.....	149,050	184,364	720	859
Poultry.....	.....	.....	16	22
Beer, dozen bottles.....	134,423	118,001	241	190
Beer, casks, gallons	97,960	89,487	31	34
Barley, bush	1,120,567	625,083	781	365
Bread & biscuit, lbs...	13,517,950	14,739,607	634	648
Indian corn, bush.....	83,029,799	75,812,036	45,486	35,535
Corn meal, lbs	309,949	363,424	865	972
Oats, bush...	623,629	5,417,981	248	1,605
Rye, bush...	2,758,236	4,892,183	2,933	2,739
Rye flour, bbls.....	4,864	4,034	23	14
Wheat, bush	139,465,522	113,510,923	179,991	121,182
Wheat flour, bbls.....	5,538,367	5,203,386	32,643	27,387
Oth'r cereals	.....	.....	1,196	773
Farina, &c..	.....	.....	2,215	1,535
Prep'd coffee & cocoa....	.....	.....	77	60
Dried apples, lbs	3,061,026	7,197,427	185	287
Green appl's, bush.....	1,121,714	1,388,773	1,191	980
Other fruit..	.....	.....	254	224
Preserved fruit.....	.....	.....	420	366
Ginseng, lbs .	373,635	383,641	509	456
Cotton seed oil, gals....	6,222,813	4,477,251	2,879	1,868
Bacon and hams, lbs..	694,171,580	682,427,741	46,483	47,726
Beef, fresh, lbs.....	65,885,832	90,329,619	6,679	4,537
Beef, salted, lbs.....	40,810,640	34,171,267	2,598	2,173
Butter, lbs..	33,466,551	34,148,043	5,676	4,890
Cheese, lbs..	105,402,018	127,218,460	9,633	11,441
Condensed milk.....	.....	.....	111	108
Eggs, doz....	79,034	89,921	13	14
Fish, dry, cwts.....	166,195	185,116	686	690
Fish, fresh..	.....	.....	116	73
Fish, other..	.....	.....	1,894	2,577
Lard, lbs....	537,526,956	360,104,781	25,113	21,100
Preserved meat.....	.....	.....	7,590	6,730
Mutton, lbs..	2,127,453	2,326,063	162	119
Oysters.....	.....	.....	538	445
Pickles.....	.....	.....	16	12
Pork, lbs	87,707,562	77,360,620	5,410	4,397
Onions, bush	54,102	63,300	49	59
Potatoes, bsh	667,672	827,412	500	598
Other vegetables.....	.....	.....	81	76
Other vegetables, preserved.....	.....	.....	130	109
Rice, lbs	30	33,819	....	2
Salt, bush...	21,312	43,394	6	13
Cotton seed, lbs.....	11,536,137	15,931,258	129	137
Spirits, gals.	9,559,089	7,658,279	8,627	8,482
Sugar, raw, lbs	13,858	41,077	1	3
Sugar, refined, lbs	89,454,808	63,174,881	2,645	5,431
Molasses, gls	3,854,073	3,750,276	471	804
Candy.....	.....	.....	73	30
Vinegar, gals	14,447	20,466	4	6
Wine, gals...	149,837	43,811	118	47
Other goods.	.....	.....	$396,905	$322,786
	.....	.....	356,149	332,374
Total.....	.....	.....	$753,054	$655,160

RECAPITULATION OF GRAIN EXPORTS FOR 11 MONTHS.

Articles.	Quantities. 1880.	Quantities. 1879.	Values. 1880.	Values. 1879.
	Bush.	Bush.		
Barley	1,120,567	625,083	$781	$365
Indian corn..	83,029,799	75,812,036	45,486	35,535
Oats.....	623,629	5,417,981	248	1,605
Rye.....	2,758,236	4,892,183	2,933	2,739
Wheat.....	139,465,522	113,510,923	179,991	121,182
Total.....	226,997,753	199,058,206	$231,739	$161,426

While, therefore, the general domestic export increased 15 per cent., that of food produce increased 23 per cent., and of grain alone, 37 per cent. Last year, during the eleven months of the fiscal year, food produce constituted 50 per cent. of the entire domestic export, and this year 51½ per cent.

This clearly shows the tendency. The production and export of cereals and food produce in general has been rapidly on the increase of late years, and, with fair crops as we have got them, there will be a growing export in the future, whether the European crops are good or bad. There is a steady surplus for export, and this surplus has to find an outlet, either in Europe or partly in the West Indies or elsewhere, whether the European crops are good or bad. If they are good, we shall have to force the export by prices low enough to undersell the European producer, and, finally, to induce him to devote his acres to other cultures than that of wheat, for example, as the farmer abroad does not seem capable of competing with ours in growing that staple. During the remainder of this year, if the European crops turn out as abundant as they are represented to be, we shall, of course, have to be prepared to sell our surplus much cheaper than we have done so far this year, unless something unforeseen should occur in the East—like, for instance, a war between Turkey and Greece, possibly involving one or more of the great powers, and thus causing interference with grain shipments from there and an extra demand to feed armies in the field.

The Fall Trade.

From all parts of the country, and from all branches of agriculture and industry, come reports well calculated to encourage the belief that the coming fall trade is likely to be an exceptionally favorable one, and it is thought by many that it will surpass any during the last decade. This belief rests partially upon the happenings and actual transactions of the last few weeks, and partially upon an examination of the causes likely to affect the volume and the character of the trade. Speaking generally, our crops are good and ample, and there is fair promise that in some instances there will be great abundance. This is true for the leading classes of grain, for cotton, tobacco, sugar and rice. While the quantities are more than satisfactory, the prices promise to be so also. The course of the markets of the world has not at least been unfavorable to us, those articles with which we enter into competition with foreign countries being fairly well maintained. We may, therefore, expect from those who buy from us our breadstuffs, provisions, cotton, &c., large sums of money or their equivalent in goods, in our securities and partially also in specie. It is not expected that these returns, which will flow into the coffers of the Western farmer and the Southern planter, will aggregate those received during preceding years. Still they will represent a handsome profit, and will add largely to the purchases on the part of consumers. On all sides the stimulating influence of a large prospective demand is felt by dealers and manufacturers, who are making extensive preparations, the call upon their facilities having been exceptional even at the present juncture. The distribution has now begun. From the reports of those directly engaged in supplying the wants of Southern markets, whose merchants are the first to make their appearance as buyers in the distributing centers, the fall trade will not disappoint the hopes of the most sanguine, so far as volume is concerned.

A year ago the legitimate improvement of business was exaggerated into a "boom" by wild speculation. From that period of feverish, unhealthy activity the country has now fully recovered. The experience of the past is a guarantee against errors in the near future. The strong element in the markets of most commodities is the fact that, owing to a lack of disturbing causes, prices are not excessive nor unsteady. Values, on the contrary, remain moderate, and are not subject to sudden unwarranted variations. Both producers and consumers feel the effect of this return to a solid basis, and the wheels of trade turn steadily and without stoppages. All branches of industry and manufacture will in turn feel the stimulus of this improvement, the main foundation for which is the present and prospective prosperity of the country, if affairs are cautiously and prudently conducted.

The American Association for the Advancement of Science has been in session during the last week, and its proceedings have brought before the public many papers of general interest well calculated to aid in the accomplishment of the end which the society professes to aim at. It is currently reported that there is a growing dissatisfaction on the part of a number of the older members with the fact that the association is becoming entirely too large. It is urged by them that it is getting unwieldy. If the presentation before the meetings of much that is undigested and unimportant matter is accepted as evidence of such overgrowth, we are inclined to indorse their views. Among the contributions accepted by and published under the auspices of the association there are many which give proof of the fact that they have escaped close examination before presentation, and which lead to doubting whether there is any restriction barring the acceptance of papers. A liberal interpretation of the by-laws regulating such matters is favorable to the growth and does not injure the prestige of a scientific body; but we have had occasion repeatedly to notice how the absence of such supervision is injurious to their best interests. The American Association is one, but by no means the only, example of such lack of management. Hours of the precious time of learned bodies have been wasted listening to elaborate essays on familiar topics without one original thought or one new fact. Polemical discourses have been sprung upon such meetings in the absence of the opposing parties merely because the proper officers failed to exercise their duty of insisting upon a supervision. If it is against the danger of such occurrences that some members of the association are protesting, they are entitled to support. The policy of that body is to secure an ever-growing number of members, whose interest should be retained by a careful selection of the matter brought before them. The best way of securing a large audience and extended influence is not by giving every one an opportunity to hear his own voice.

The Business Outlook in South America.

The grain crops in Europe have this year, with few exceptions, proved bountiful—so much so that it is not likely we shall get there for our cereals, on an average, within 30 per cent. of the price which they realized during the last two years. The Spanish American countries and Brazil will, therefore, be all the more important for us to ship to not only flour, but provisions, preserves, &c. The general improvement in business inaugurated in the fall of 1879 also largely benefited them, and they obtained much better prices for their produce. The subsequent general reaction in February and March of this year affected the value of the latter much less than it did that of other goods, and, as the following quotations at New York of a few leading articles of theirs will show, prices have, on the whole, been well sustained till now:

	1874. March 19. Cents.	1879. Sept. 6. Cents.	1879. Oct. 15. Cents.	1880. Aug. 18. Cents.
Sugar, fair refining Cuba..	7½	6⅞	7⅜	7¾
Cocoa, Guayaquil	10	19	20½	13
Cotton, middl'g uplands.....	15¼	12¾	10⅞	11⅝
India rubber, fine Para.....	69	70	87	84
Coffee, good cargoes Rio.....	25¾	14⅜	16½	16⅛
Hides, Buenos Ayres	26	22	23	24
Goat skins	40 @ 50	45 @ 55	45 @ 60	45 @ 52½
Deer skins.....	46 @ 57	30 @ 35	35 @ 40	47½ @ 55

While cocoa has receded to old figures, deer skins have improved.

In Cuba there is a short sugar crop this year; in the Brazils a deficient coffee crop is now followed by an abundant one. The prices at which Spanish Americans and Brazilians sell their produce at present are, taken as a whole, remunerative to the planter and herd owner; their purchasing capacity is, therefore, unimpaired, so far as their productions are concerned, and the course of business would promise to be smooth in those countries during the remainder of the year if it were not for the disturbed political condition in some of them. To begin with our nearest Southern neighbor, Mexico, we are glad to perceive that the Presidential election has been weathered without serious trouble. There is every prospect that General Gonzalez, the new President, will prove as able a first magistrate as his predecessor, President Porfirio Diaz, for he bears the character of uprightness and energy. The Mexican people are bent upon material improvements, and are just preparing to grant important privileges to a couple of American railway companies for an extension of our system into the heart of Mexico, which will largely use American rolling stock. Another American railroad contractor is building a line across the Isthmus of Tehuantepec.

Cuba has just escaped the danger of a second insurrection through the good management of Captain-General Blanco, and, we trust, may now have before her a period of undisturbed recovery. Porto Rico is rapidly repairing the first inevitable drawbacks entailed by emancipation. St. Domingo has emerged successfully from a short counter-revolution, and is now thoroughly pacified. The same thing has happened in Hayti after a more protracted struggle.

In Central America considerable progress has been made in railroad building in Guatemala and Costa Rica; everthing would look bright there but for some frontier disputes which have arisen between Costa Rica, Nicaragua and Colombia. Costa Rica denies Nicaragua the right of disposing of the Nicaragua route without her consent, and Colombia disputes Costa Rica's claim to the ownership of the Golfo Dulce. There is some apprehension of a war between them, which, it is feared, may involve the whole of Central America, unless a timely amicable arrangement should prevent it. Costa Rica is the Chili of Central America; she is rich, and President Guardia is a military man of great daring. The matter is becoming so threatening that the new President of Colombia, Dr. Nuñez, has gone down to Panama to be on the spot.

Venezuela and Ecuador are getting on satisfactorily. President Guzman Blanco, of Venezuela, has promptly quelled a revolution on the banks of the Orinoco, and is now assiduously engaged in regenerating his country. Railways are being built to connect the coffee regions with the coast. The gold mines of Guayana are being developed satisfactorily and the country prospers. The size of the cocoa crop will indemnify Ecuadorian planters for low prices.

In Brazil the coffee, sugar and other crops all promise well, the northern provinces are free from drought, and greater economy is straightening the finances without interfering with the steady extension of railroads. Everything tends to prepare great prosperity in that region.

Uruguay finds it impossible to square her budget without a return to former high import duties, the finances having been compromised by mismanagement under the late administration of ex-President Latorre, who hovers on the Brazilian frontier, causing some uneasiness. In the Argentine Republic serious trouble has arisen between the province of Buenos Ayres and the remaining provinces on the occasion of the late presidential contest, which was decided in favor of Gen. Roca, who vanquished the Indians on the frontier. Buenos Ayres was blockaded and besieged and some blood shed, but a compromise has happily been effected, and the dangers of a fierce civil war seem averted. As next to Chili and Costa Rica the Argentine is the most prosperous republic in Spanish America with which we do a considerable trade, our people will greet with joy a lasting pacification there.

Chili has continued to flourish in spite of the gigantic war she has been carrying on for some 18 months along a coast one-third the length of all South America. She has occupied the rich guano and nitrate deposits of Peru and Bolivia, has fought victoriously half a dozen well-contested battles, captured or destroyed the Peruvian fleet, and is now meditating the siege of Lima. This may, however, not be effected during the present year; it will require another army of 20,000 men and large disbursements, unless a counter-revolution at Lima and La Paz brings about a sudden peace, the conditions of which will cripple the allies for the balance of this century. All proffers of mediation have thus far been declined.

From the preceding sketch it will be seen that the restlessness of Spanish Americans has not ceased to create some revolution or war, but the world has got so accustomed to this ever-recurring turmoil that business with those countries does not seem to be very seriously affected by these troubles, so long as there is not a downright blockade like the one on the Peruvian coast just at present. To judge from the past history of these countries, many generations will yet pass by in most of them ere they settle down to a quiet, conciliatory mood. In any event we have to take them as they are, and try to shape our business relations with them as best we can without unreasonably exposing our interests.

Transmitting Sound by Light.

Great impetus has been given to research by the discovery of the fact that it is possible to transmit sound over great distances by means of so simple an apparatus as the telephone. Important discoveries have succeeded one another in rapid succession, and it has been characteristic of this movement that the first efforts have generally been directed to make the fruit of scientific inquiry available for practical purposes. The public has grown so accustomed to startling and novel experiments that it is quite prepared to accept, without much critical examination, exaggerated statements of wonderful discoveries. It will be remembered how, some time since, a scientific hoax, coming from the staid little town of Bethlehem, obtained much currency. It was finally contradicted, but not before it had brought forth rival claimants to the discovery of the transmission of images by electricity. Among those who were spoken of as having been at work in this direction was Prof. Alexander Graham Bell, of telephone fame. Nothing definite was known at the time, and it is only now that an authoritative statement has been made. Prof. Bell's experiments, while they do not prove to be relative to the subject indicated, are of high interest, and open new fields likely to yield a rich harvest. Mr. Bell has succeeded in perfecting apparatus by which he can transmit sound by means of light. A sunbeam may be used to carry a message from one place to another, and, as Mr. Bell has put it, we are enabled to hear a shadow at a distance. The principle upon which these curious results are obtained is based upon the influence of light upon the electric conducting power of selenium. Variations in the conducting power produce sound in the telephone in the same manner that changes in the strength of induced currents of electricity do. If, therefore, there are rapid variations in the intensity of the light to which a selenium cell is exposed, a sound will be produced in a telephone in electric circuit with it. The receiver, therefore, is a selenium cell of peculiar construction in a circuit with a telephone and a battery. After many trials the following form of transmitter was adopted as capable of well fulfilling the condition of producing a rapid succession of changes in the conductivity of the selenium corresponding in frequency with the vibrations of sound. To produce this "undulatory beam of light," as Mr. Bell calls it, he uses a flexible mirror in its simplest form, like silvered mica or thin glass. Against the back of this mirror the speaker's voice is directed, causing the mirror to vibrate. A beam of sunlight is concentrated upon it by means of a lens, and

after reflection from it, is again rendered parallel by means of a second lens. From the latter it travels to the distant station, where it is received upon a parabolic reflector, in the focus of which is the sensitive selenium cell.

With this apparatus, which is probably capable of much greater adaptation and refinement of detail, Mr. Bell has succeeded in transmitting complete sentences for a distance of nearly 700 feet. It is not, of course, expected that this discovery of displacing the telephone wire by a ray of light will prove of any immediate great practical value, although it is difficult to say under what circumstances we may find it convenient or expedient to use light as a carrier of spoken messages from one point to another.

The sudden and universal interest taken by men of means in the development of our Western mines has had the effect of calling into some prominence a class of adventurers and unscrupulous men who infest the mining camps and the money centers. Under the guise of a "mining engineer" or of a "practical miner," they offer their services to promoters and would-be investors as experts. They may be divided into two classes—one represented by those who, with a good knowledge of their profession, are ready, for a reasonable amount, to sell their opinions; and the second composed of men whose greatest crime is that they do not know what they are reporting about. Of the two the former are, perhaps, the most dangerous alike to the interests of the country at large and to those of an important and worthy profession. It cannot, it appears, be denied that the class alluded to is more numerous than generally believed. It is a difficult matter to convict them, because the vicissitudes of mining furnish them an opportunity to interpret deliberate misstatements in a way favorable to themselves as soon as subsequent events have proven their true character. Engineers must make it a point to evade anything that may in any way contribute to cause doubts of their disinterestedness to arise. Their names should never, before or after their reports, appear in the list of stockholders. Their confidence in the intrinsic value of a mine may be so great as to make it appear to them too valuable an opportunity for profitable investment to be lost. Such a step would naturally induce many to look upon the property with more confidence, and they would feel inclined, should their venture fail, to charge the offending engineer with improper motives. We instance this as one of the many dangers to be avoided by the members of a profession who must, above all others, rely upon their reputation for success.

A very instructive table on the affairs of four great workingmen's societies is published in *Engineering*, giving an excellent idea of what such organizations are effecting in England. The total membership of the four associations referred to foots up to 77,472, divided as follows between them: Engineers, 44,087; iron founders, 11,914; boiler makers, 17,400, and steam-engine makers, 4071. In the order mentioned, these societies had an income in 1879 of £135,267, £42,547, £46,975 and £10,618 respectively, while their expenditures were £245,827, £80,809, £66,299 and £15,674. The Engineers' Society paid out the following amounts: For sickness, £26,515; accidents, £1880; funerals, £7388; superannuation, £17,730; to members out of work, £131,101; for benevolent grants, £6379; and for disputes and strikes, £39,402, the latter being exceptionally high. The distribution of the moneys collected is similar in the case of the other trades, though, of course, the relative proportion of the disbursements varies according to the circumstances affecting each particular trade. The totals for the four societies will, perhaps, best exhibit the distribution of the funds. The money collected from over 77,000 workingmen during the year 1879 was £235,407, or $1,137,000, while the expenditures footed up to £408,610, or $1,974,000, leaving a cash balance and arrears summing up to £186,631, or $901,000. The heaviest item in the expenditures was that of donations and traveling expenses to those unemployed, aggregating, as it did, £229,097, or $1,106,000. Next in order is strike pay, which footed up up to £53,124, or $256,000, while the items for sickness, accidents and funerals make the respectable total of £65,498, or $315,000. Adding to this the sums paid out for superannuation, or £23,908 ($115,000), it will be seen that the bulk of the income of these trade unions was devoted to objects looking toward the aid of those whom adversity had made fit subjects of assistance. The fact that the sums paid for maintaining a state of war against their employers are comparatively small, is creditable to both the workingmen and to those who need their labor. The disbursement of large amounts for such purposes cannot help being distasteful to those who, in the hour of sickness and distress, look to the funds accumulated by their efforts. It should be noted that the administration of these societies is remarkable for economy, and their present state is a good proof of the capacity of English mechanics for self-government.

It is stated that a series of experiments is to be made at an early date with Captain Ericsson's new system of submarine attack.

The American Institute of Mining Engineers.

Some Notes of the Summer Meeting at Lake Superior.

(*Specially Reported for The Iron Age.*)

HOUGHTON, Mich., August 26, 1880.

The most memorable, and, in some respects, most enjoyable meeting of the American Institute of Mining Engineers is not yet over, and it is somewhat too soon to write its history, especially as at the moment of this writing your correspondent is using his satchel for a table, and is dividing his time between studying scattered notes and listening to the music furnished by a brass band, every member of which can say, with a clear conscience, what was once inscribed on the tombstone of an enterprising but not altogether successful citizen: "He done his level best." However, as these are hasty notes, written when opportunity offered, and not serious and consecutive correspondence, no one will complain if they partake somewhat of the character of the music which at this moment disturbs the writer's meditations, but which, fortunately, we are leaving behind, its diminishing echoes recalling the lines of Holmes:

"And silence, like a poultice, comes
To heal the blows of sound."

Properly speaking, this meeting of the Institute begins and ends in New York, and such notes as can be forwarded up to this date must necessarily partake somewhat of the character of entries in a pocket diary, "To be continued" from day to day until this most delightful of excursion parties breaks up, and those who compose it are gone, every man to his own place.

FRIDAY EVENING, August 20.

Gathering of members and ladies at the depot of the Pennsylvania Railroad in Jersey City, each man loaded with traps of one kind or another, and occasionally grasping frantically at his duster skirts or exploring the depths of his pockets in search of his special ticket to Chicago and return. Tickets seem to have the faculty of eluding search and evading discovery, which is in proportion to one's anxiety for their safety. But none were lost on Friday evening—they only played hide and seek occasionally.

Dr. Drown is, as always, invaluable. In recognition of his versatility he is appointed sleeping car conductor for the trip, and placed in supreme command of three coaches, with occupants enough to fill one comfortably. Naturally, he is anxious. The proportion of passengers per car is much lower than that fixed as a minimum by the P. R. R., and the question of their willingness to haul so many cars for so few people is raised. Dr. Drown distributes his passengers so as to make the best showing possible, but the attempt is a miserable failure, and the practiced eye of the train conductor is not deceived by the attempt to make bundles of shawls and overcoats, surmounted by traveling caps, look like passengers who had settled down for a nap. But for once the rule of the P. R. R. is relaxed, and reasonable assurance is given that the three cars will be hauled through to Chicago.

Dr. Drown has another cause for anxiety. He has chartered three cars at a fixed price per car, and is "out" some dollars per car. Happy thought! Will take sections instead of berths and see him through. However, the deficit is not so great as at first appeared. Some get on at Trenton, more at Philadelphia, and a few at other points along the line. The party is attaining respectable proportions.

SATURDAY, August 21.

Hot, dusty, tiresome. First inquiry: "How did you sleep last night?" Stop three times at long intervals for meals. Feel as if it was so long since we had eaten anything that we ought to begin easy on peaches and watermelon. Last remark: "Guess I'll turn in."

SUNDAY, August 22.

"No breakfast until we get to Chicago?" "How soon shall we be there?" "Porter said we'd be there in half an hour when he waked me up." "Yes, he said we'd be 'there,' but he did not specify where." "——!" "——!!" "All out for Chicago." It seems as if it ought to be about noon, but it's only 8 o'clock. Party take 'busses for the Grand Pacific, and, generally speaking, get unsatisfactory assignments. Hotel clerk tells those who complain that he's sorry, but 450 photographers came in last night and there is not another room in the house. Tells everybody else who complains that 450 mining engineers have arrived that morning. Facts are that there are only about 45 of each society in the house or expected. Clerk has made a characteristic Chicago estimate.

Everybody says: "What a beast of a breakfast!" Waiters look as if they had been up all night. Let us take a look at the city. Knights Templars have been gone some days, but the city still wears its holiday dress. Every available building is covered with huge red crosses, shields bearing the devices of the Royal Arch and Templar degrees of masonry, flags and banners of black and yellow, crosses, crowns, &c. Along the lake side the tents of the encampment are still standing, flapping in the wind. Headquarters, alongside of the exhibition building, looks as if it had been struck by lightning. Arches still span the streets along which the procession moved, but they are reduced to bare poles. "Why don't the people call in these preparations for an event long past?" No one can answer. Perhaps they have a reason, but in New York this litter would have been cleared up within twenty-four hours after the show was over.

Several new-comers report and are welcomed. Our party is growing, and by the time Marquette is reached it will be quite as large as was expected. "You will be called at 5.45 to-morrow morning. Good night."

MONDAY, August 23.

Everybody says: "The breakfast this morning was worse, if anything, than that yesterday morning." Explained on the ground that the house has been overtaxed for a fortnight, and the machinery of the kitchen and the housekeeper's departments have not yet resumed smooth working. We all take omnibuses for the depot of the Chicago and Northwestern Railroad, where a special train, kindly furnished with the compliments of the company, awaits our arrival. We are to "wild cat" all day—dodging along from station to station by telegraph, and reach Marquette in time for supper. The accommodations consist of a baggage car, a directors' car and two ordinary coaches. One of the latter is taken for a smoking car. The day is uneventful, and the train arrives in time, pulling up at Marquette before dark.

"Follow the plank walk and you will find the steamer at the wharf, on the left-hand side." It is raining pretty hard, but no matter—the distance is short.

The ladies are shown to their state rooms, and a few elderly or infirm gentlemen are likewise favored. A few more have the same privilege, for good and sufficient reasons other than age and infirmity. The rest are shown to a compartment on the main deck usually devoted to freight, which has been swept and garnished and filled with cots, giving it the appearance of a ward of an army hospital. The steamer Northern Queen is, unfortunately, small, though the largest which could be chartered for the purpose this season. The officers have done the best they could, but they have not had a great deal of experience in carrying passengers. Cattle are more in their line. The accommodations are pretty rough, but most of the members are content, and those who are not slide off quietly to a hotel on shore. They are voted "swells," and those who remain congratulate themselves that they have the more room.

Supper! Welcome announcement. It is not very good, and the table will not quite accommodate all the party, but it is better than nothing, and while the first relief are eating the second relief amuse themselves around the piano. Mr. Birkinbine plays "Home, Sweet Home," and one of the hungry gentlemen in waiting remarks that if his home were not more harmonious than that he should be glad to get away from it. The pianist is discouraged, and leaves the instrument, amid expressions of general gratification.

Everybody is tired and sleepy, and soon the cabins are deserted, the state rooms locked with satisfied occupants within, and the unprotected males in the dormitory on deck "turn in." Soon the suppressed growl merges into the lusty snore, and noisy sleep reigns supreme.

TUESDAY, August 24.

Breakfast at 6 sharp. The rain falls as if Lake Superior had concluded to come ashore in bucketfuls. But the business which brings us here cannot be postponed on account of the weather, and we must see some of the famous mines of the Marquette district, in spite of rain and mud ankle deep. We start at 7.20 for the iron mines at Negaunee and Ishpeming, on a special train furnished by the courteous officers of the Houghton and Ontonagon R. R. The liberality with which the railroad companies of this district furnish trains without charge is beautiful to behold. Moreover, our friends of the mining interest see that every train we take is provided with a well-stocked *buffet* in the baggage room, and that refreshments are various and abundant. Reaching Negaunee at 7.50 we visit the McComber Mine, then the South Jackson, then the Jackson. We have at the Jackson what is called a lunch, but what would be more accurately described as a first-class course dinner. No one would have supposed such elegant hospitality could have been extended in what seems to us from the East "such an out-of-the-way place." This is more than a square meal—it is cubical.

We leave Negaunee at 12.30 p. m. and go to the Cleveland Mine, Ishpeming; thence to the New York, Lake Superior and Barnum mines, after which we return to Marquette.

Anticipating to-morrow's excursions, some account of the mines and furnaces of this favored district is in order. From data kindly furnished by the local committee, Messrs. Jay C. Morse, C. Y. Osborne and D. F. Wadsworth, we obtain the following interesting particulars:

MARQUETTE

is located on the south shore of Lake Superior, and has one of the finest harbors on the lake, which, under the protection of the government breakwater, may be entered without difficulty during the most severe storms. Twenty-five years ago the town was a mere hamlet; but with the development of the iron mines it has gradually improved, and now numbers about 5000 inhabitants. Its location is very picturesque and attractive. A high range of quartzite skirts the southern limits of the city, and near the east end is Mount Mesnard. The summit of the mount commands a fine view of the country to the north, south and west. The north portion of the city is built upon a broad range of greenstone, and has an elevation of 80 feet above the lake. The Holly Water Works, supplemented by additional machinery made at the Iron Bay Foundry, supply the city with lake water, containing only 2½ grains of mineral water to the gallon.

Marquette is the eastern terminus of the Marquette, Houghton and Ontonagon Railroad, and the western terminus of the Detroit, Mackinaw and Marquette Railroad, now in course of construction. The advantages which this new outlet will afford to Marquette and its mining interests are many. The road passes through an almost unbroken wilderness, the soil of which is well adapted to agricultural purposes. It will cheapen all farm products. Portions of the country which this new line traverses are heavily timbered with fine hard wood, which cannot fail to attract the attention of charcoal iron workers.

The iron-ore docks extending out into Marquette Bay belong to the Marquette, Houghton and Ontonagon Railroad Company and to the Cleveland Iron Mining Company. Their aggregate daily capacity is 10,000 gross tons. The leading industries of Marquette are brown sandstone and ganister quarries, the Carp River, Pacific Rolling Mill and Grace furnaces, the Iron Bay Foundry and Railroad Company's shops, the Lake Superior Powder Company and the Marquette Lumber Company.

The brownstone quarries are located in the south part of the town. Only a short distance from them are the Marquette and Pacific Company's works. These works consist of a blast furnace and rolling mill for muck bars. The furnace was first put in blast in 1871, but it has not been continuously run. Its total product of bituminous coal or coke pig iron is 39,250 gross tons. About one-half mile farther down the bay is the Carp River Iron Company's charcoal furnace. This furnace was constructed in 1873. Most of the charcoal is brought in on cars. Total product of the furnace to January 1, 1880, is 16,325 gross tons. One-half mile west of the furnace a ganister quarry has been opened. This is a new enterprise—shipments to January 1, 1880, amounting to 8840 gross tons. The Grace Furnace, owned by the Lake Superior Iron Company, is located on the north side of the harbor. It was built in 1872 and went into blast in December of that year. This furnace has been idle since the panic of 1873, but is starting up again. A short distance west of the Grace Furnace are the machine shops, foundry and boiler works of the Iron Bay Foundry. These works supply the greater portion of the machinery used in the Marquette iron district and part of the Menominee iron range. One mile northwest from Marquette are the Lake Superior Powder Company's works. They manufacture black powder, glycerine and its compounds. The location of the works, on the banks of the Dead River, is very picturesque and charming.

NEGAUNEE

is located in the hematite range, on the line of the M., H. and O. R. R., at the junction with the C. and N. W. Ry., 13 miles westward from Marquette and 401 miles nearly north from Chicago. The Jackson Iron Mines and the Pioneer Furnaces gave this city its first start. The name Negaunee is the nearest Indian translation of Pioneer. The city numbers to-day nearly 4000 people.

The Jackson Iron Mine, situated at the east end of the town, is one of the oldest mines in Marquette County. The formation is very irregular, and presents many interesting geological problems. The manner in which these natural difficulties have been met cannot fail to attract the attention of mining men. The company have just completed a map of the mine, with several cross sections of the same. The ore is a first-class specular, well adapted to Bessemer steel purposes. The total shipments from 1853 to January 1 of this year are 1,921,960 gross tons.

On the south side of Negaunee are a number of soft hematite mines. Prominent among them are the McComber, Rolling Mill, Manganese, New York Hematite, Milwaukee, Chicago and the Pendill Mine, near the M., H. and O. R. R. station. The McComber is now the leading mine of this group. The ore is more or less magniferous, is fairly low in phosphorous and silica, and averages well in metallic iron. The mine is well supplied with improved mining machinery. The company are now preparing to work the mine in the future as an underground one. It is interesting to notice how much the structure on an end section represents banded jasper, though the silica is more or less perfectly dissolved out.

To the east and adjoining the McComber is the Manganese Mine, and still farther east is the Rolling Mill Mine. The latter has produced more ore than any one mine on this range. The ore when properly mined is of excellent quality. The mine to January 1, 1880, had shipped 198,862 gross tons of ore. Northwest from Negaunee, about 1½ miles, are the Cambria and Bessemer soft hematite mines.

ISHPEMING,

two miles west of Negaunee, has a population of 7000, and embraces within its city limits the Cleveland, New York, Lake Superior and Barnum iron mines, which are all first-class specular ores, and are now worked underground, together with the Lake Angeline and Salisbury mines, which are worked above ground. The name Ishpeming is a Chippewa word signifying "on the summit." It was chosen because within the city limits is a natural divide, from one side of which flows the Carp River into Lake Superior, and upon the other the Escanaba into Lake Michigan. Several diamond-drill holes, sunk by the mining companies of this district, have developed the fact that within the Ishpeming basin is an enormous body of ore, and from analyses made of these cores, where the ore beds were penetrated, it appears that the percentage of phosphorus is very much less than near the surface. It was at the Cleveland and New York mines where the large fall of rock of over 500,000 tons occurred a little more than a year ago. This accident materially lessened the product of these mines. The cave-in virtually closed the main opening of the Cleveland Mine from May until long into last winter. The company was obliged to drive a double and a single incline tunnel shaft through the loose rock, and to accomplish this over 1,000,000 feet of timber was used.

The Cleveland Mine, like nearly all the iron mines of Lake Superior, was first worked in an open pit. The first ore was mined in 1853, and the following year 3000 tons of ore were shipped. The total of shipments to January 1, 1880, is 1,941,900 gross tons. The principal workings of the mine are the No. 3, the incline and the saw mill. The workings are easy of access, and are illuminated by the Brush electric light. The deepest workings are 200 feet below the surface. They have used the diamond drill extensively to explore the unworked ground in the vicinity of the present workings. The Marquette Iron Bay Foundry is now putting in for this company what is considered one of the best hoisting plants of the entire Marquette iron district.

Adjoining the Cleveland on the north are the workings of the New York Mine. This mine was opened in 1864, and has been successfully operated since that date. Total shipments to January 1, 1880, 866,413 gross tons—an extraordinary production for a 40-acre tract.

The Lake Superior Mine is about one-half mile west of the Cleveland, and was opened in 1857. The workings are as extensive as those of any mine in the district. The deepest are now over 300 feet below the surface. Total shipments to January 1, 1880, 2,174,580 gross tons—a little larger output than any other company's. The Lake Superior has also shipped more ore in a single year than any other mine of this district. The mine is easily entered, and presents some interesting features not met with at the other mines. The company have largely employed the diamond drill in putting down drill holes near the present workings, with very satisfactory results. Like the Cleveland Mine, new discoveries have been made which will require many years to mine. The Lake Superior Mine ore is well suited to Bessemer steel purposes, and the No. 7 shaft affords a fine quality of specular slate ore that contains only 0.027 of phosphorus.

The workings of the Barnum Mine adjoin the Lake Superior, and to a stranger they all appear as belonging to the same mine. The Barnum Mine is owned and operated by the Iron Cliffs Company. They have done considerable boring with the diamond drill, and now are sinking two shafts on the northwest side of Ishpeming to meet a large body of ore, which the diamond drill penetrated at about 600 feet below the surface. This will virtually open a new mine on the north side of Ishpeming.

Only a short distance southeast of the Lake Superior Mine workings is the Lake Angeline Mine. This mine belongs to the Ishpeming group. The ore consists of soft and hard hematite, which is of a good quality, suitable for Bessemer steel pig. Less than a quarter of a mile to the south is the Salisbury, a soft hematite mine, and southeast from these another quarter of a mile is the New National, a hard specular ore. South of this again, less than a fourth of a mile, is the National Mine. The Winthrop and Mitchell, soft hematite mines, are still further to the southwest, and west of these are the Lowthian, New England, Section 19, Saginaw and Goodrich mines. The Lowthian is a soft hematite. The Saginaw, Section 19 and Goodrich are specular ores. These mines are situated upon a branch of the Marquette, Houghton and Ontonagon Railroad, about three miles from Ishpeming.

West of Ishpeming, on the M., H. & O. R. R., at Lake Angeline, is the Excelsior Furnace, which was leased from the Lake Superior Iron Company by the Carp River Iron Company, and remodeled last fall. It went into blast April 5, 1880, and burned down June 9, and is now rebuilding.

The Boston is located on a branch which leaves the main line 9 miles from Ishpeming. It was opened May 1, 1880. The ore is a specular slate, which averages above 67 per cent. in metallic iron, and not more than .016 in phosphorus.

At Clarksburg, 10 miles from Ishpeming, is the Clarksburg Furnace.

HUMBOLDT.

The Humboldt (formerly known as the Washington) and Edwards mines are located at this place. They each produce magnetic and specular slate ores. Total product of Humboldt to January 1, 1880, 444,468 gross tons, and of the Edwards, 224,029 gross tons.

The Republic Mine, nine miles from Humboldt, was opened in 1872, and, after the completion of the branch railroad in October of that year, shipped 11,025 gross tons of ore before the close of navigation. The total of shipments to January 1, 1880, is 956,140 gross tons. This mine probably possesses more interest, practically and scientifically, than any other mine within the county. In a general way the openings along the vein, nearly a mile in length, form an imperfectly shaped horse shoe. The vein dips at a high angle towards the centre of the basin thus formed. The ore is chiefly micaceous specular slate, which is easy to drill and to mine. A small portion is magnetic. Compressed air is used for power. The air compressors are worked by water power on the Michigamme River, one mile from the mine, from which point a 16 inch pipe line conveys the air to the mine. The compressed air not only operates the power drills, but it also drives all of the hoisting and other machinery connected with the mine plant.

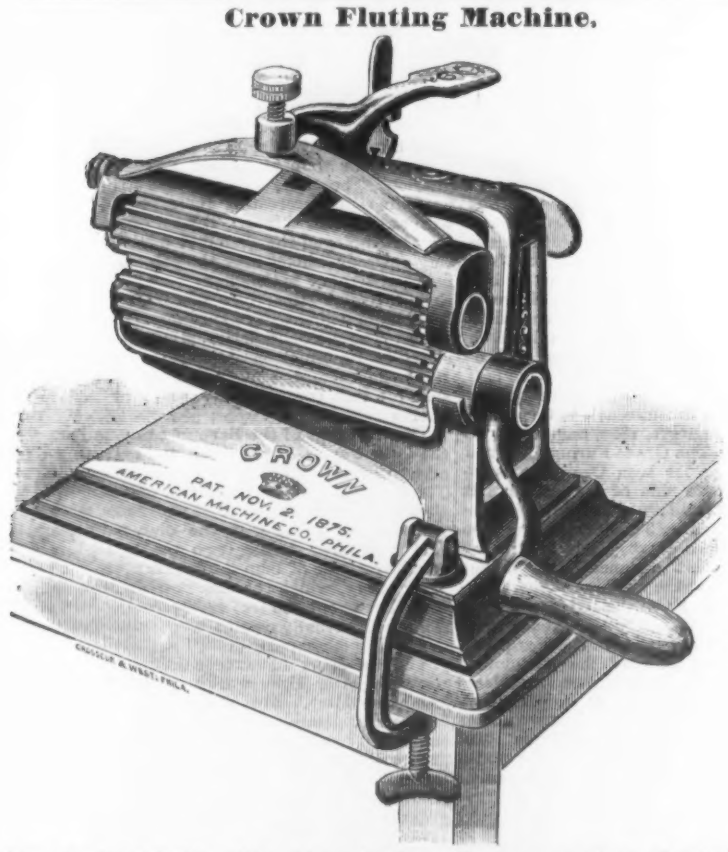
The Kloman Mine is located a few hundred feet from the Republic Mine proper, and is on the northwestern extension of the Republic vein. The mine was worked from 1873 to 1875, closing down in the latter year. It remained idle until this season, when Messrs. Shumway & Wicker obtained a lease of it. The deepest workings are 175 feet below the surface. The ore is a micaceous specular slate, portions of it resembling that of the Republic.

The Champion Mine is nearly a mile southwest of Humboldt. The mine site is well elevated, and commands a fine view of the country round about; in fact, it is one of the most attractive mining locations in the county. The ore stratum and the other members of the iron series have here an east and west strike, and dip very high to the north. The ore occurs in lenticular masses of various sizes, sometimes several hundred feet in length and nearly a hundred feet wide, and sometimes 50 feet, or even less, in length, by not more than 5 feet wide, at its strongest point. The larger axes of these lenses usually pitch to the west. No. 3 shaft is down to the eighth level, or 500 feet below the surface. This shaft is kept lower than the others for the purpose of drainage. The ore is a fine quality of specular slate and magnetic. It contains a large percentage of metallic iron, and on the lowest levels averages about .035 in phosphorus. The hoisting plant of machinery, with D. H. Merritt's interior gear friction, is well worthy of a careful examination. The power drill has nearly supplanted hand drilling. The total product to January 1, 1880, was 717,251 gross tons.

MICHIGAMME

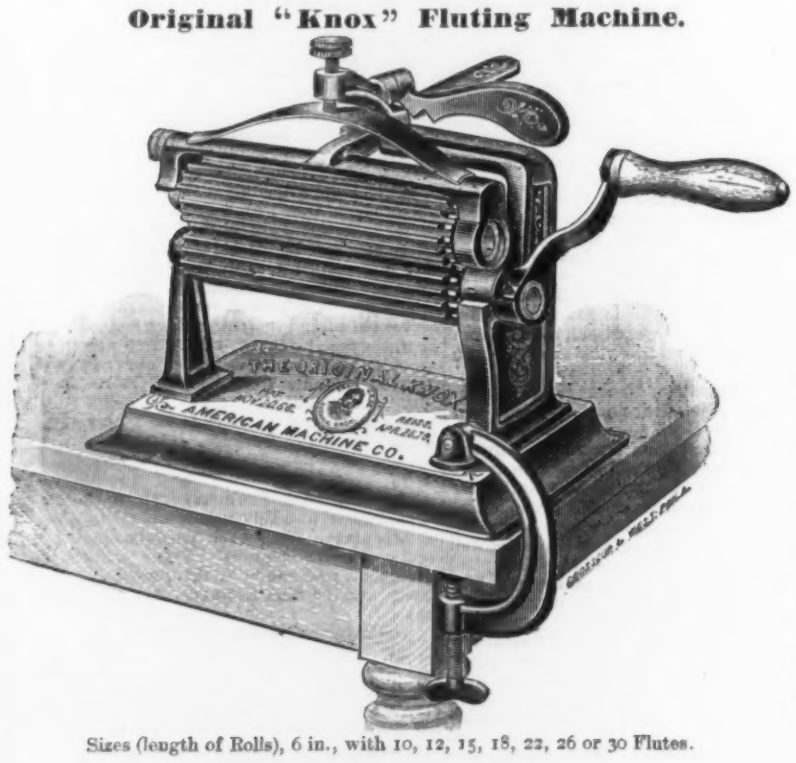
is quite a lively mining town upon the south side of the mine workings. The Michigamme Mine was opened in 1872, and has been in constant operation since. The ore bed dips from 50° to 60° to the south, and the strike is nearly due east and west. The workings consist of seven shafts, numbered from east to west. No. 4 shaft, the deepest, is 327 feet below the surface, measured on the lay of the vein. The ore is principally

Crown Fluting Machine.



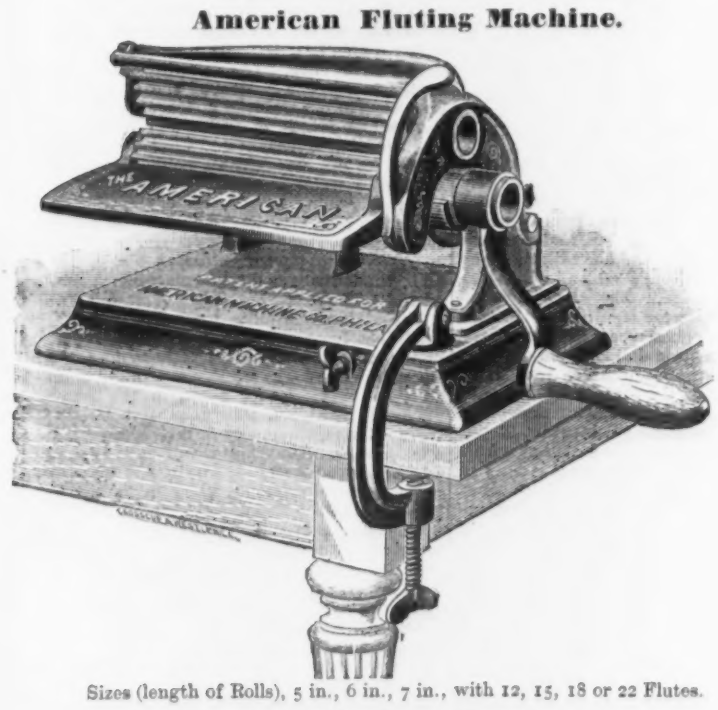
Sizes (length of Rolls), 4½ in., 6 in. and 8 in., with 10, 12, 15, 18, 22, 26 or 30 Flutes.

Original "Knox" Fluting Machine.



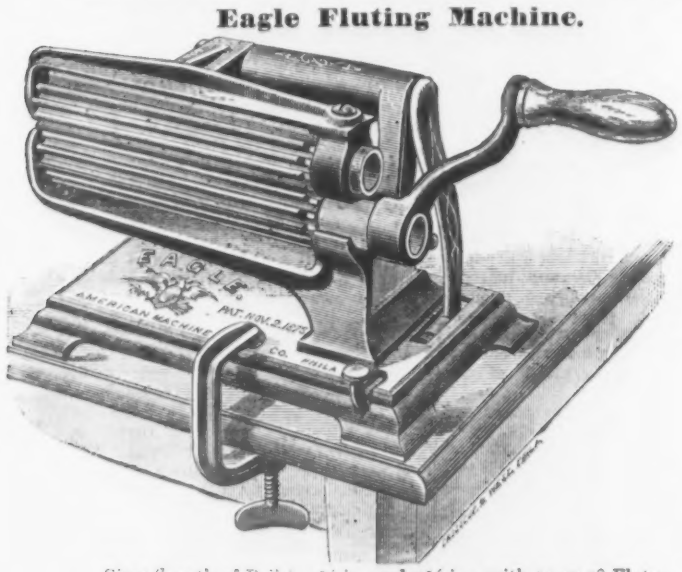
Sizes (length of Rolls), 6 in., with 10, 12, 15, 18, 22, 26 or 30 Flutes.

American Fluting Machine.



Sizes (length of Rolls), 5 in., 6 in., 7 in., with 12, 15, 18 or 22 Flutes.

Eagle Fluting Machine.



Sizes (length of Rolls), 5½ in. and 5½ in., with 15 or 18 Flutes.

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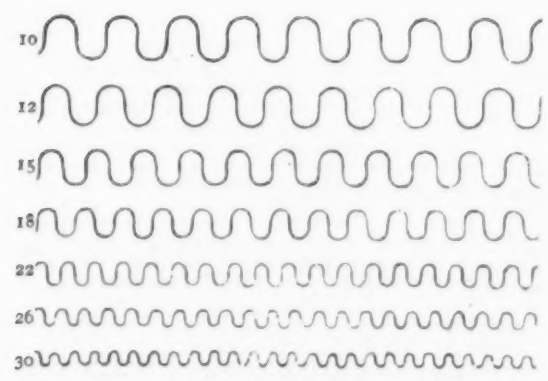

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Star Fluting Machines,

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American Fluting Machines,

Original 'Knox' Fluting Machines,

Crown Hand Fluters,

Crown Plaiting Machines,

Bickford Portable Pump,

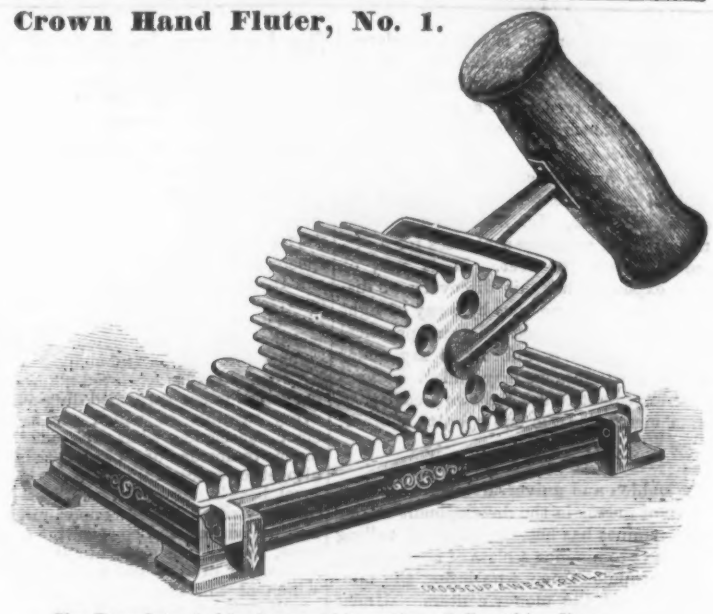
Crown Christmas Tree Holders,

Crown Can Openers,

Mrs. Potts' Patent Crown Sad Irons

&c., &c., &c.

Crown Hand Fluter, No. 1.



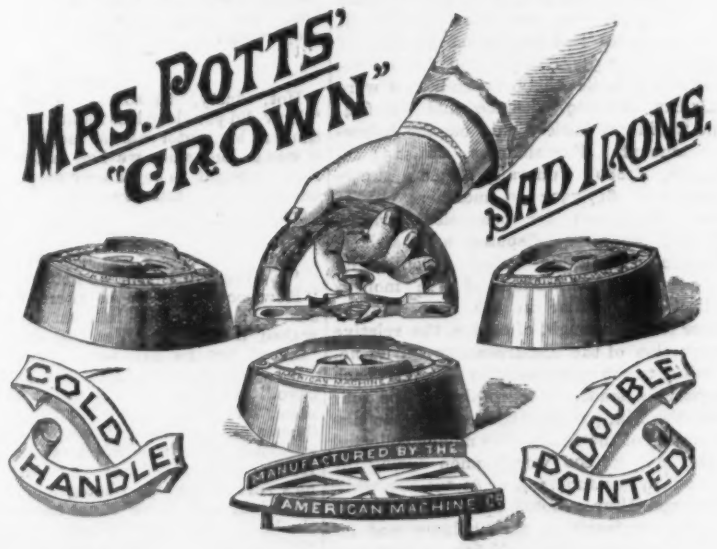
Size Baseplate, 6½ in. long, 3¼ in. wide. Roll, 2⅜ in. diam.

Crown Hand Fluter, No. 2.

Size Baseplate, 6½ in. long, 3¼ in. wide. Roll, 1⅜ in. diam.

Crown Hand Fluter, No. 3.

Size Baseplate, 5½ in. long, 3 in. wide. Rolls, 1⅜ in. diam.



a granular magnetic, and is of an excellent quality The total shipments to January 1, 1880, were 332,950 gross tons.

One mile west of the Michigamme is the Spurr Mine, which was opened in 1873, but has been idle since 1877. The mine has a fine plant of hoisting machinery which was equal to its requirements. The total shipments of the mine to January 1, 1880, were 143,504 gross tons.

Adjoining the Spurr on the west is the Stewart Mine property. But little work has been done here. Two shafts were sunk in 1877, and altogether 2987 gross tons have been shipped.

Six miles east of L'Anse a branch track, 2½ miles long, is being constructed to the Taylor Mine. This is considered one of the largest soft brown iron ore deposits in the country. The ore is rich in metallic iron and low in silica. L'Anse, the western terminus of the M., H. & O. R. R., has about 2000 inhabitants, and is sixty-three miles west of Marquette. It is located at the head of L'Anse Bay, and has a very fine harbor. The M., H. & O. R. R. Co. have ample ore docks for handling the ore. The docks are 546 feet long. The railroad to this point was completed in 1872.

The following tables are of great interest:

AGGREGATE SHIPMENTS OF IRON ORE FROM MARQUETTE DISTRICT TO JANUARY 1, 1880.

	Gross Tons.
Lake Superior Iron Co.	2,174,580
Jackson Iron Co.	1,946,575
Cleveland Iron Mining Co.	1,941,900
Humboldt (Washington)	444,468
New York	866,254
Pittsburgh and Lake Angeline	498,956
Iron Mountain Mine	18,341
Edwards Mine	224,629
New England Mine	110,506
Champion Iron Co.	717,251
Barnum Mine, Foster Mine, Salisbury Mine, Excelsior Mine, Section 12 — Iron Cliffs Co.	434,239 / 104,816 / 173,172 / 15,844 / 5,026
McComber Iron Co.	193,284
Rolling Mill Mine	198,862
New York Hematite (Grand Central)	33,208
Marquette Iron Co.	115,164
Winthrop Hematite Co.	103,622
Palmer Mine (Cascade)	160,427
Cheshire Mine (Smith)	66,375
Home Mine	25,736
Republic Iron Co.	950,146
Mitchell Mine (Shenango)	41,650
Michigamme Iron Co.	332,950
Rowland Mine	2,998
Miller	4,756
Howell Hoppock	2,206
Teal Lake Mine	2,610
Carr Mine	2,380
Albion and Gilmore Mines	4,592
Goodrich Mine	20,006
Himrod Mine	2,065
Keystone Iron Co.	52,570
Spurr Mining Co.	143,504
Alden Iron Co.	9,347
Saginaw Mining Co.	351,634
Green Bay Iron Co.	12,948
Kloman Iron Co.	63,678
Michigan Mining Co.	4,439
Manganese Iron Co. (Negaunee)	26,911
Cleveland Hematite Co.	30,183
Hungerford and Harlow	139
Stewart Iron Co.	2,987
Bessemer Iron Co.	47,259
Cambria Iron Co.	27,025
Erie and Magnetic Iron Cos.	1,136
Pendili Mine	3,385
Home Mine	4,080
Gribben Iron Co.	3,599
Chicago Iron Co.	949
Orion Mine	501
Milwaukee Mine	941
Total	12,801,271

AGGREGATE SHIPMENTS OF PIG IRON FROM MARQUETTE COUNTY TO JANUARY 1, 1880.

	Gross Tons.
Pioneer Furnace	136,541
Northern Furnace	15,059
Collins Furnace	41,997
Michigan Furnace	41,531
Greenwood Furnace	40,202
Bancroft Furnace	54,618
Morgan Furnace	57,573
Champion Furnace	31,048
Deer Lake Furnace	26,684
Grace Furnace	11,346
Marquette and Pacific Furnace	39,250
Excelsior Furnace	1,450
Carp River Furnace	15,210
Cliff Furnace	8,209
Total	520,718

The First Session.

TUESDAY EVENING, August 24.

After supper the members and guests assembled in the long and narrow state-room cabin of the Northern Queen, and were called to order by the president, Mr. William P. Shinn.

In opening the session Mr. Shinn expressed regret that he had been unable to carry out his intention of presenting as the address from the chair, a review of metallurgical progress in the United States since 1876. It would be remembered that in that year Hon. Abram S. Hewitt, then president of the Institute, presented a masterly review of the development of metallurgical science up to that time. The chair had hoped to complete this record, which would recount a progress more rapid than had ever before been known. He had, however, been prevented from carrying out this intention by the imperative demands upon his time, and the pleasant duty must be reserved for another occasion.

The Lake Superior meeting had so long been looked forward to that it had become a tradition of the Institute. He was sure that the results of this visit would in no respect disappoint the expectations formed, and that the members would carry away delightful memories of open-handed hospitality.

The first paper of the evening was by Mr. Joseph D. Weeks, entitled "Notes on the Workings of the Blair Process in India." This paper was based on information gained from Mr. Walter Ness, who lately visited this country. It was of much interest, and will appear in our columns as soon as the notes have been worked up in shape for publication.

The second paper was entitled, "Ore in Sight," by Prof. Presifor Frazer, Jr. We can only say that it was an ingenious presentment of the law of variation of figures in nature, illustrated by a chart of the soundings in New York Harbor. The description of this chart was clever and amusing, but was only intended for an introduction to a more serious paper to follow during the course of the meeting.

The third paper was by Prof. C. O. Thompson, of Worcester, Mass., on "The Action of Sewage Water on Boilers and Condensers." This paper, based on some curious experiences in Worcester, is of much general interest, and will appear in our columns. The meeting then adjourned, subject to the call of the chair.

WEDNESDAY, August 25.

Another early start, but this time with good weather, which lasts all day. The air is as stimulating as wine—cool, dry and almost crisp. We leave the steamer at 7.20, and are carried by the M., H. & O. R. R. Co. to the Republic, Champion and Michigamme mines. A very nice lunch, dispensed by the ladies of the place (mostly young and charming and all good-natured and hospitable), was served at Republic. L'Anse was reached at 7.30 in the evening, where our steamer was found awaiting us. As the lake was very rough the whole party came to L'Anse overland, leaving the steamer to come around without passengers. The refreshments on the train were suited to all tastes, beginning at lemonade and ranging as high up in the scale as any one cared to go. Everybody says: "What a delightful day we have had." We spend the evening singing, reading, writing letters or debating affairs of State in solemn council, according to our tastes or our official responsibilities. Our steamer was to carry us to Houghton before dark, but for some reason clear to the nautical mind, but obscure to every one else, we lie here until daybreak. As it makes no difference to us, everybody is satisfied.

(To be continued.)

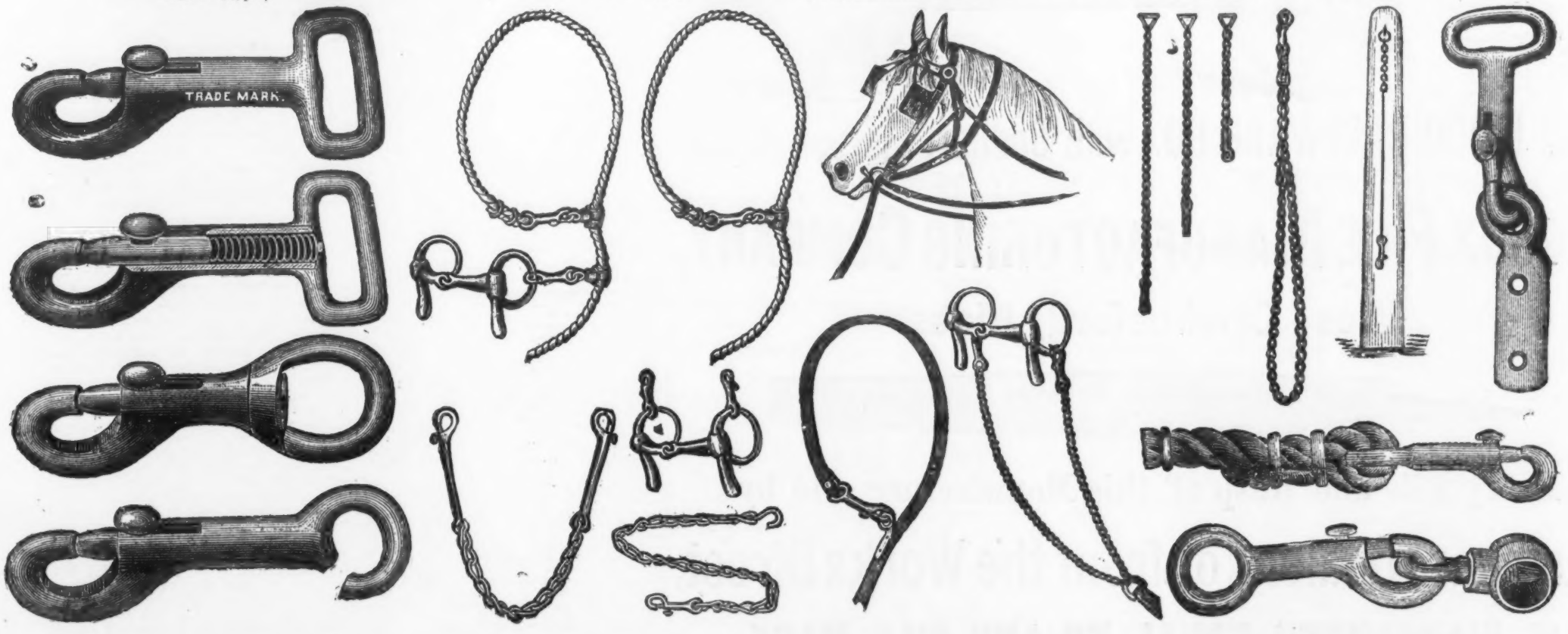
The Boilers of the Seawanhaka.

John K. Mathews and Austin Jayne, United States Local Inspectors, have addressed a report on the Seawanhaka disaster to Stephen R. Kirby, Supervising Inspector. We give below that portion of it relating to the boilers of the Seawanhaka, as likely to be of general interest. We may add that Messrs. Mathews and Jayne are among those indicted by the Grand Jury:

Upon examination of the boiler after the accident we found two of the top rows of flues in the starboard boiler—the outboard one and the inboard one—to be ruptured close to the back flue sheet, the cracks extending about half the circumference, open one-eighth at the widest part and tapering to nothing at the ends, having the appearance of being pulled apart. Samples of these were cut out and found to be the original thickness, or nearly so; the middle flues in the same row were intact; also the lower flues. The return tubes were found to be drawn and loosened in the tube sheet on the outside next the shell; the middle ones seem to be all right and in good condition, showing the disturbing cause to have been near the outside or shell of the boiler. We also found the fusible plug in the back connection melted out and a cock in the front leg broken, probably caused by something falling upon it after the boat was beached. These openings combined would account for the water getting out of this boiler. The port one was found with water in it and apparently intact. One of the tubes of the starboard boiler had been taken out before our visit to the wreck by David M. Nichols, a boiler maker doing business at Gouverneur Slip, New York, without the authority of the owners and before the inspector had made an examination. This tube was second or third from the outside shell of the starboard boiler in the lower row. He states that he found a hole of 3½ inches in diameter in it (in a 3½-inch tube). This hole, he says, was about 2½ feet from the end of the tube in the furnace end of the boiler, and consequently the same distance from the front connection, which has hinged doors to open and shut at pleasure, and is neither water nor steam tight. He also states that he cut off a piece of the same tube, commencing 4 inches from the rupture, and subjected it to a pressure of 350 pounds to the square inch, and it showed no signs of distress.

After due and careful consideration of the evidence and circumstances connected with this case, we are led to believe that the boilers of the steamer Seawanhaka were perfectly intact and tight until after the vessel was beached, for the following reasons—namely: That there was no escape of steam or water which is clearly proven) up to that time; hat had there been a rupture of a tube of the dimensions which Mr. Nichols described, there would have been such a rush of hot water and steam into the fire-room and forward lower cabin that there could be no mistaking it. The steam arising from it through the forward cabin stairway and fire-room hatch would have been plainly visible to every person on the main deck, and the evidence is that there was no such escape at either end of the boiler; that had the flues found defective been ruptured by pressure of steam, it would have blown the boilers to pieces and produced an explosion, but the metal where the rupture took place was about 3-16ths of an inch thick (the original thickness), and was capable of withstanding a pressure of ten times more steam than she was carrying that day. Further, we are of opinion that all the ruptures found by this board in the starboard boiler of the Seawanhaka were caused by the expansion of the shell from the long continued and intense heat of the burning vessel around them, and the reason that the lower middle top flues and middle return tubes were all intact was because of their greater distance from the shell and the protecting influence of the steam rushing in from the port boiler.

In view of the foregoing facts, we are firmly of the opinion that all the ruptures found in the starboard boiler occurred after the vessel was put on shore. The cause of the fire was undoubtedly back draft forcing the gases and flames out from under the grate bars and around the furnace doors, igniting the woodwork in the immediate vicinity, and induced, probably, by the condition of the atmosphere and the sudden shutting off of the jet. This is not an isolated case; many vessels have caught fire from the same cause; nor is the rumbling sound, as described by the witnesses as resembling distant thunder, unfamiliar to engineers with certain conditions of coal upon the grate. It is in evidence that the officers and crew behaved well; also, that had the passengers taken the advice of the officers and remained on board until she was grounded, they would nearly all have been saved. There were 40 lives lost by this accident. The vessel was a total loss.



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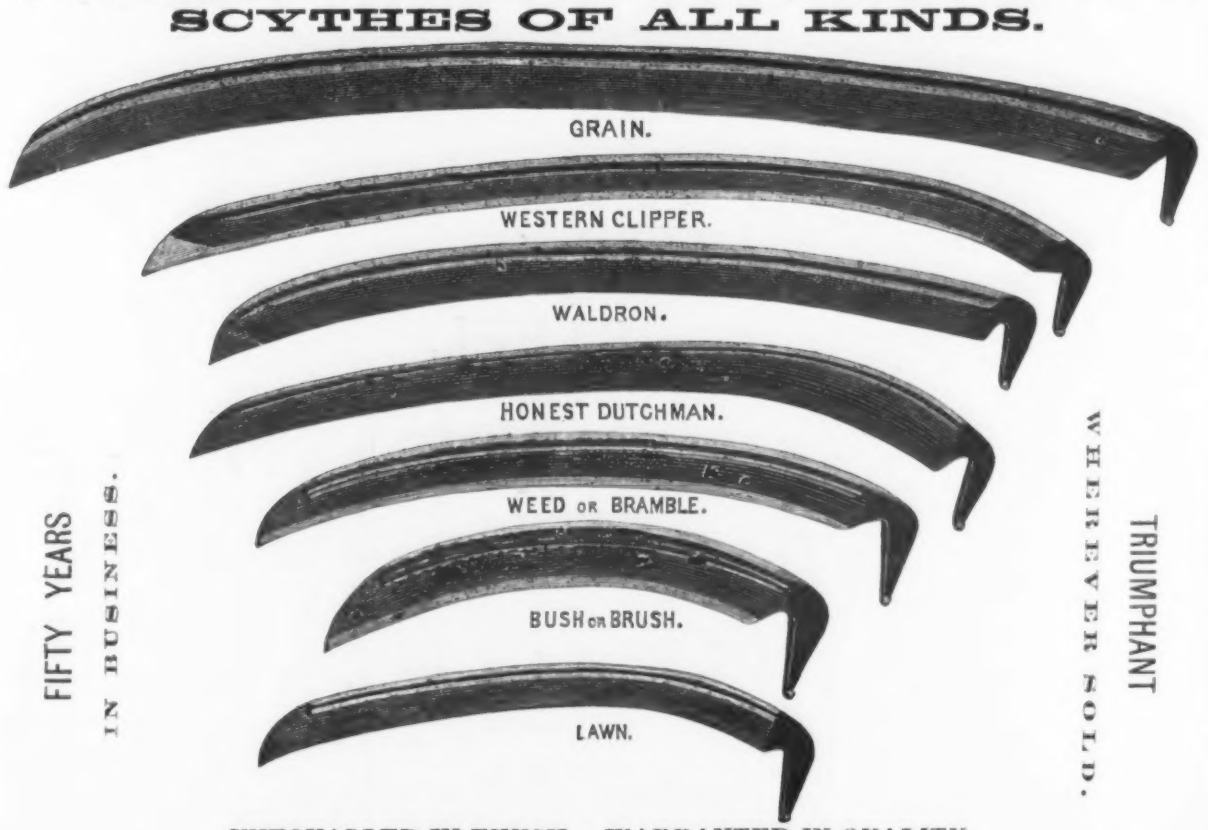

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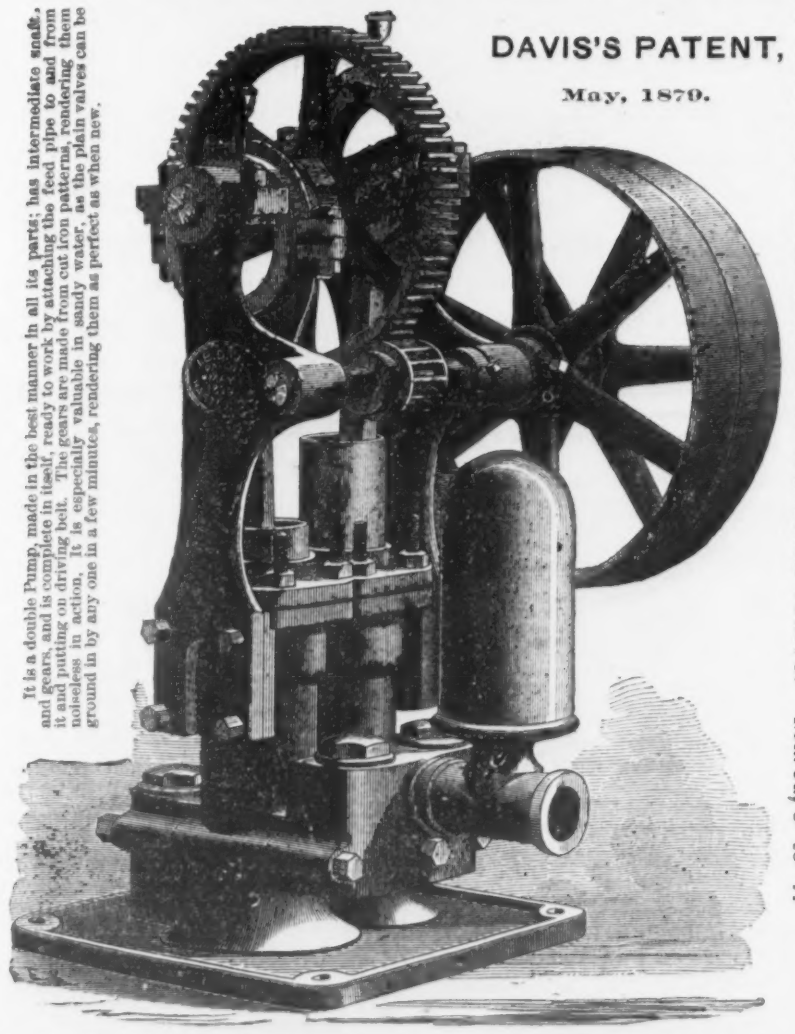

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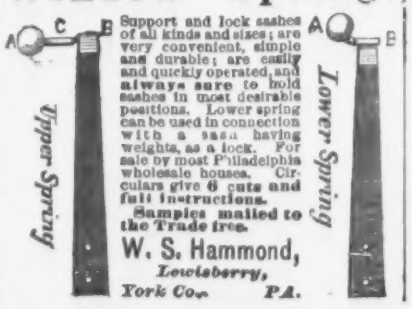

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Samples mailed to the Trade free.

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Ganymede Pattern Knobs.

Full size cut of No. 2364.

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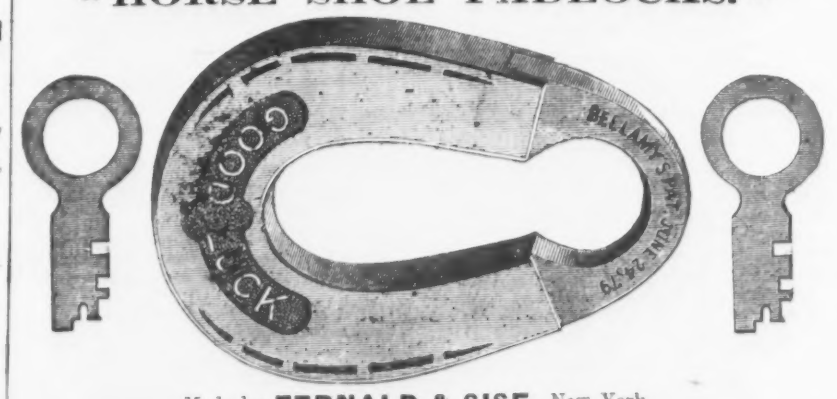

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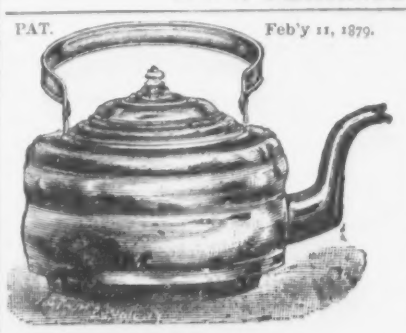

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For Sale at a Bargain.

A Double Tool Post Planer, one of the best in the country. Table, 24½ ft. long; width between uprights, 10 ft. 3 in.; hight, 10 ft.; weight, nearly 80 tons; up and down feed; cross head raised and lowered by power; built by Woodruff & Beach, at a cost of $20,000.

One 90-inch Lathe, built by the Ames Mfg. Co. Has universal swivel tool post and cross feed, adapting it for boring and turning bevels or tapers. A substantial and first-class tool. Address

H. B. BEACH & SON,
Hartford, Conn.

To the Stove and Hardware Trade.

Our works are again in operation. Orders for Stoves, Heaters, Ranges, Hollow Ware, Hardware Goods, &c., solicited.

STUART, PETERSON & CO.,
Broad and Noble streets,
Philadelphia.

For Sale.

Cold Blast Charcoal Furnace.

First-class in every respect and ready for immediate blast. Stone stack, ample water power; 2000 cords seasoned wood on hand. Charcoal can be had at 4½ cents per bushel at furnace. For further particulars address

ROBERT W. MONROE,
Kingwood, W. V.

To Capitalists and Mill Men.

Parties now controlling one of the best and most promising rolling mills in the Central West are desirous of adding to their capital and management. They offer portions of their capital stock for sale to acceptable parties. For particulars, address JOHN BROOKS,

Care C. & H. V. and C. & T. Genl. Ticket Office,
Columbus, Ohio.

WANTED.

To know of a good opening for a first-class Hardware store, or of some one wishing to sell in some live town in Ohio, Michigan or Indiana. The latter State preferred. Give full particulars, terms, &c. Address,

HOTCHKISS, Hardware,
Care Drawer No. 1262,
Elkhart, Indiana.

FOR SALE.

A one-half interest in stock and fixtures of a retail Hardware business having A No. 1 trade, carrying a stock of general Hardware and Housefurnishing goods, Stoves, Tinware and Agricultural Implements. Main store on line of railroad; branch store at a small inland town 6 miles distant. Present stock about $10,000. One of the best chances in Southern Michigan for a person wishing to engage in the Hardware trade. Address,

G. F. MURRAY, Reading, Mich.

Wanted.

Traveling salesmen among the Hardware trade in the Eastern and Middle States. We have a desirable line of Builders' Hardware and specialties, and will pay fair commission. None but those established with the trade need apply.

Address, BUILDERS' HARDWARE,
Office of *The Iron Age*, 83 Reade Street, N. Y.

AGENT WANTED,

Who is selling goods to Housefurnishing trade and would like to sell a line of Wooden Ware on commission in New York and Western States.

Address, Z. T.,
Office of *The Iron Age*, 83 Reade St., New York.

FOR SALE.

Valuable Patent right, No. 227,804, dated May 8, 1880, for bending wires quickly and accurately to a quadrangular shape. Address,

WM. SMITH,
33 South Sixth Street,
Philadelphia, Pa.

NAILS.

Four hundred kegs of Harrisburgh Nails will be sold cheap for cash. Address, SPECULATOR,
Office of *The Iron Age*, 83 Reade St., New York.

Sanderson Bros. Steel Co.

A limited number of shares for sale by

EDWARD FRITH & SON,
241 Pearl street, New York

SITUATION WANTED—By 1st October, as Rolling Mill Manager, Assistant Manager or Bookkeeper. Have held such positions since 1860. Can furnish best of references from late employers and others. Address, ROLLING MILL,
Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

SECOND-HAND and NEW TOOLS FOR SALE LOW.

September List No. 1.

Miscellaneous Second-Hand Tools.

All in Good Order, and will be sold very low

One Engine Lathe, 96 in. swing x 18 ft. bed.
Seven Engine Lathes, 18 in. swing x 7½ ft. bed, chair feed.
Two Wood-Turning Lathes.
One Speed Lathe.
One Polishing Lathe, 20 in. swing x 20 ft. bed.
One Polishing Lathe, 25 in. swing x 22 ft. bed.
Two Spinning Lathes.
One Upright Drill, 16 in.
One Bench Drill.
One Pulley Polishing Machine.
One Pointing Screw Machine.
Three Speed Lathes, 6 ft.
A lot of Wood Working Machinery.
Two Profiling Machines, Two Spindle.
Six Small Punching Presses.
One N. Y. Safety Steam Power Co., Upright.
15 H. P. Engine, and 20 H. P. Upright Boiler with all connections, &c.

NEW TOOLS, Very Low.

Five No. 2 Bolt Cutters, Wood & Lighte.

A complete set of Shafting & Pulley Lathes, new.

One 15-inch Shaping Machine.

Please specify which of the above tools you want and we will forward all particulars.

STEAM LAUNCH,

40 ft. x 7 ft.; draws 3 ft; Engine, 5½ x 9; Boilers, 32 x 48. Fitted with carpets, &c., for pleasure.

A Woodruff & Beach Beam Engine,

Low pressure, 42-inch cylinder, 84 inch stroke, with fly-wheel pulley 20 feet diameter, 36 inch face, and

Four Tubular Boilers,

60 inches in diameter, 20 feet long, and all connections practically as good as new.

For sale by

The Geo. Place Machinery Agency,
121 Chambers and 103 Reade St.,
NEW YORK.

To Iron Manufacturers

FOR SALE.

The ROLLING AND PUDDLING MILLS of the late Hudson River Iron Co., at Poughkeepsie, New York. This property is well situated on the Hudson River and New York Central and Hudson River Railroad, and is in good condition for immediate occupancy. It contains all the machinery necessary for the manufacture of Merchant Iron, Rail and Bolt Spikes, Bolts, &c. Parties in search of this kind of property are invited to examine, and for other particulars to address

W. S. JOHNSTON, Trustee,
Poughkeepsie, N. Y.

To Inventors and Manufacturers.

The FORTY-NINTH EXHIBITION OF THE AMERICAN INSTITUTE will open September 15. Heavy machinery will be received August 23; other goods, September 6. For blanks and information, address

GENERAL SUPERINTENDENT,
American Institute, New York City.

HAVE YOU READ THIS?

JENNINGS' DISCOUNT TABLES.

(2½ to 85% and all the combinations.)

We find them correct and wonderfully "labor saving."—Sargent & Co., New York.

To further introduce the work, the **Present Edition** will be sold at half price, as follows:

Counting House Edition..... $1.00
Pocket Edition, Cloth Bound..... .50
Pocket Edition, Paper Covers..... .25

Currency may be sent by mail at publishers' risk.
Address, S. H. JENNINGS, Deep River, Conn.

A Canadian Firm Engaged in Manufacturing Wire Cloth & Wire Goods,

Having spare power and room which they wish to utilize, would like to hear of some line in Hardware which they could add to their business, and work without a great outlay for machinery.

Apply to CANADIAN,
P. O. Box 725, Montreal.

For Sale.

Hardware store in Providence, R. I. Business doubled in last four years. Stock new and in the best of order. Present stock, $16,000. Reason for selling, owner has other business.

Address W.,
Olneyville, R. I.

Bissell & Welles,

Wholesale Hardware Auctioneers,

83 Chambers and 65 Reade Sts., N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and importers.

Notice to Consumers of Fine Light and Medium-Weight Gray Iron Castings.

NORTH BROTHERS have leased the Foundry, N. W. cor. Twenty-third and Race Streets, Philadelphia, and solicit correspondence with the trade.

For Sale.

In Los Angeles, California, an interest in Wholesale and Retail Hardware, Stoves, Iron Pipe and Manufacturing Tin and Sheet Iron Ware. A rare opportunity for a good business in a climate unsurpassed in the world. For particulars, address

B. F. COULTER.

Special Notices.

A LARGE ASSORTMENT
OF
New and Second-Hand Machinery.

STEAM ENGINE MACHINERY.

One Delamater Sugar-house Engine 26 in. x 48 in.
Five Horizontal Engines, new, 9 in. x 16 in.
Four " " 8 in. x 12 in.
One Portable Engine, 5 horse power.
One Horizontal Engine, 11 in. x 18 in., Whitehall & Hampsen.
One Upright Engine, 16 in. x 16 in. [ferty.
One Horizontal Engine, 15½ in. x 30 in., Todd & Raf-
One Upright Engine, 7½ in. x 10 in.
Two Horizontal Return Tubular Boilers, 100 h. p. each.
One 25 h. p. Horizontal Engine.
One Horizontal Engine, 200 h. p.
One Boiler, 5 ft. x 15 ft. 83 3 in. Tubes.
Two " 5 ft. x 14½ ft. 100 2¾-in. Tubes.

MACHINISTS' TOOLS.

One Vertical Boring Mill, bore from 26 to 90 inches.
One Turn Table and Boring Mill, 11 feet between columns.
Two Slabbing Machines.
One Lathe, 18 in. x 8 ft., Screw Cutting.
One Merrill Compressed Air Hammer, Hotchkiss Patent.
One Punch and Shears combined, will punch 1¾-inch hole in 1-inch iron in the center 30 in.
One large Shears, will cut ¾ iron any size.
Two Ensley Drills.
One New Haven Mach. Co. Drill, will bore in center 60 in.
One New Haven Mach. Co. Drill, will bore in center 30 in.
7900 lbs. ¾ Plate Iron, for safes.
One Lathe, 24 in. x 12 ft.
One Lathe, 32 in. x 20 ft. bed.
One " 28 in. x 20 ft. "
One " 16 in. x 7 ft. "
One Pattern Makers' Lathe.
One Planer, 42 in. x 16 ft.
One " 25 in. x 6 ft.
One Crank Planer, 18 in. x 2 ft.
One Travis' Boring Machine.
Eighteen Drilling Machines.
One Root Blower.
One Bogardus Mill, No. 5.
Four Jacketed Kettles, with Stirrers.
One Large Power Punch for bridge work.
One 3000 ton Hydraulic Press and Pump.
One Dudgeon Beam Punch.
One Upright Drill, to the center of 61 in.
One " " " " " " 42 in.
Three Vacuum Tanks, 6 ft. x 12 ft.
One Hand Punch smaller.
One hundred Vises.

PUMPS.

One Knowles Special Pump, No. 7.
One Woodward Steam Pump, No. 4.
One Guild & Garrison Steam Pump, No. 3.
One Woodward Steam Pump, No. 1.
Six Hardick Steam Pumps, from No. 0 to No. 4.

J. GRAY'S MACHINERY DEPOT
37 Dey Street, New York, U. S. A.

JOHN E. SWAN & BROTHERS,

IRON MERCHANTS,

Glasgow and Middlesbrough,

Exporters of all brands of

Scotch & English Pig Iron.

c. f. i. to America and/or f. o. b. British ports.

Old Iron Rails, Puddled Bars
AND MANUFACTURED IRON.

LAMBERSON'S

PRICE BOOKS.

Full Leather, $7.50. Half Leather, $6.50.
Pocket Edition, Full Leather, $3.50.
DISCOUNT Bolt List, $1.50.
Screw List, 50 cents.
Leigh's Discount Book, 50 cents.

Address all orders to *Pope & Stevens*, General Agents, 90 Chambers Street, N. Y.,
For sale at publisher's prices by Wm. Blair & Co., Chicago; A. F. Shapleigh & Co., St. Louis; C. B. James, Detroit.

FOR SALE.

A works completely equipped for the manufacture of Carriage Axles. Is well located in relation to coal and iron, also very accessible to market.

Address E. P. BULLARD,
14 Dey St., New York.

HAMMACHER & DELIUS,

Hamburg, Germany,

62 Alter Wall,

Solicit correspondence with American Manufacturers and Inventors in regard to representation in European countries.

Wanted.

Three or four first-class Traveling Salesmen, to travel in the West for a large Iron and Hardware establishment. Must be men of good business ability, and have experience in that line of business on the road. Address

SALESMAN, care of Jos. D. Weeks,
Office of *The Iron Age*, 77 4th ave., Pittsburgh, Pa

SITUATION WANTED.—As Rolling Mill Manager by a practical Iron Worker. Has for about ten years been Rolling Mill Manager. Has a thorough knowledge of Rolling Mill Machinery. Can furnish plan for mill, and drawings for Puddling and Heating Furnaces, with or without boilers attached to furnaces to work by blast or draft. Can put in Rolling Mill Machinery. Good references given. Address MANAGER,
Office of *The Iron Age*, 83 Reade St., New York.

THOSE WISHING TO BUY OR HAVE FOR SALE SECOND-HAND

PRESSES or DROP HAMMERS

will please communicate with

N. C. STILES,
Middletown, Conn.

FOR SALE.

A stock of Hardware in one of the best towns of its size in the State. Business established in 1860. The death of George H. Humphreys, of the firm of Rowan and Humphreys, necessitates the closing out of our stock. This is a rare opportunity for any party wanting to engage in trade. Our trade for the past twenty years has been very prosperous. Address

JEROME ROWAN, Batavia, N. Y.

Wanted.

A STEAM PISTON BLOWER, with air cylinder 24 in. diam. and 24 in. stroke, with steam cylinder capable of maintaining an air pressure of 15 to 20 pounds per sq. inch, with 60 pounds of steam.

Address G. W. STORER,
140 North Third St., Philadelphia.

Special Notices.

NEW HAVEN WIRE WORKS

Manufacturers of

IRON AND STEEL WIRE.

WAREHOUSE WITH

E. S. Wheeler & Co.,

54 CLIFF ST.,

NEW YORK.

FOR SALE.

The Best Retail Hardware Stock and Stand in Kansas City.

Is doing a good business.

PRESENT STOCK ABOUT $20,000.

Such an opportunity as this, for a couple of active, hard-working young men, with $20,000 or $30,000 capital, is seldom offered. Upon such goods as have advanced extravagantly, we will make such discounts from the present market rates that no one need hesitate about buying the stock from fear of a decline in prices. Address

J. E. FORBES & CO.,
Kansas City, Mo.

THE

Wood & Light Machine Co. Patterns

OF THE FOLLOWING TOOLS ARE FOR SALE AT VERY LOW PRICES:

Engine Lathes from 13 inch to 100 inch swing.
Driving Wheel Lathe, Double Heads, 84 inch swing, and Wheel Quartering Attachment.
Patent Shafting Lathes, 20 inch, 24 inch and 28 inch swing.
Pulley Lathes, 36 inch and 42 inch swing.
Hand Lathes from 12 inch to 20 inch swing.
Chucking and Boring Lathe, 20 inch, 24 inch and 28 inch swing.
Upright Drills from 16 inch to 60 inch swing.
Traverse Drills, 28 inch swing.
Planers, to plane from 24 inches square to 72 inches square.
Shaping Machines from 8 inch to 16 inch stroke.
Slotting Machine, 12 inch stroke, 52 inch swing.
Combined Shaping and Slotting Machine.
Slabbing Machines, three sizes.
Milling Machines, two sizes.
Milling Machines, Double Arms and Spindles.
Profiling Machine, two Spindles.
Boiler Plate Planer.
Quartering Machine for Locomotive Wheels.
Cutting off and Centering Machine, ¾ to 2½ inch.
Cutting off and Centering Machine, ¾ to 4 inch.
Cutting off and Centering Machine, 1 to 5 inch.

The above Patterns are for sale in one lot or separately, and finished work from these Patterns will be taken in payment, if desired.

The Geo. Place Machinery Agency,
121 Chambers and 103 Reade Sts.,
NEW YORK.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,

Issue Licenses to use the Process for the Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens-Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working

See page 17 of *The Iron Age* of Oct. 25th 1877.

FOR SALE.

In Birmingham, Conn., a lively, growing manufacturing village, with two water powers, gas and water throughout the village, sewers now being introduced, population 15,000 within a radius of three miles, increase of fifty per cent. since last census, one of the best and longest established and the leading House Furnishing, Stove, Tinning, Plumbing, Steam and Gas Fitting businesses in that section. Address, as above, EDWARD LEWIS, JR.,
80 and 82 Main Street.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address HARDWARE,
Box 366, Salina, Kansas.

Hardware and Implement Stock For Sale.

About $6000 stock, well assorted, at a bargain.
Box 488, Lewis, Cass Co., Iowa.

Special Notices.

Second-Hand and New

Machinists' Tools.

September 2, 1880.

One Lamson, Goodnow & Co. 2-spindle Profiling Machine.
One Engine Lathe, 90 in. s. x 20 ft. Ames, new.
One " " 92 in. x 20 ft., Seth Wilmont.
94 in. Boring Mill. A 1 order.
One Engine Lathe, 30 in. s. x 20 ft., good order.
One " " 30 in. s. x 16 ft. Wheeler, new.
One " " 30 in. s. x 12 ft. Ames, new.
One " " 28 in. s. x 27 ft. New, for shafting.
One " " 26 in. x 12 ft. New Haven, good order
One " " 24 in. x 12 ft. Ames, new.
One " " 24 in. x 10 ft. " "
One " " 20 in. x 10 ft. Fifield, new.
One " " 20 in. x 5 ft. Ames, new.
One " " 18 in. x 8 ft. Star Tool Co.
One " " 16 in. x 6 ft. New Haven, good order
Two " " 16 in. s. x 7 ft. Ames, new.
Three " " 16 in. s. x 8 ft. " "
One " " 16 in. x 8 ft. Star Tool Co.
Three " " 14 in. x 6 ft. Flather, new.
One " " 14 in. x 6 ft. Star Tool Co.
One " " 13 in. x 5 ft. Gould, new.
One " " 13 in. s. x 4½ ft. Pond, not bk. g. or screw cutting.
One Hand Lathe, 20 in. s. x 8 ft.
Six " " 11, 14 and 16 in. s. x 4½ to 7 ft. bed.
One 16 in. stroke Shaper. Wm. Sellers & Co.
One 24 in. " " Hendey.
One 32 in. x 10 ft. Planer. Lathe & Morse.
One 30 in. x 10 ft. " Wheeler.
One 26 in. x 7 ft. " New Haven, new.
One 24 in. x 5 ft. " Moore & Wyman.
One 14 in. x 2½ ft. " Gould.
One 38 in. Drill. New Haven, new.
One 34 in. " Bk. Geared.
One 24 in. " Putnam.
One 24 in. " Prentice.
One 22 in. " " new.
Six 20 in. " "
One Pratt & Whitney No. 0, 3-Spindle Drill.
One 6-Spindle Horizontal Drilling Machine.
One 4-Spindle Horizontal Drill.
Four Newell Punch Presses.
One No. 3 Wilder Punch Press. New. Geared.
Three No. 4 " " " "
One No. 6 " Shear Geared. "
One 10 h. p. Baxter Engine. Good as new.
Stephens & Boker Vises, At order, 3½ and 4 in.
Belting, Shafting, Pulleys and Miscellaneous Machinery.

E. P. BULLARD, 14 Dey St., New York,
AGENT FOR
Akron Iron Co., Hot Polished Shafting.

For Sale.

48-in. Bement Car Wheel Borer.
6-ft. Slotter, 4 ft. table, 16 in. stroke, weight 8 tons.
12 in. x 6 ft. Engine Lathe. Sellers'.
26 in. x 10 ft. Engine Lathe. N. Y. S. Engine Co.
Three old-style Bolt Cutters, one open dies.
Nos. 1, 5, 7 Pulsometers. No. 2 Prall Pump.
2-ton Chain Blocks, double length chain.
No. 6 Sturtevant Exhaust Fan and Counter Shaft.
2-in. Pipe Cutter and Counter Shaft. Morris, T. & Co.
Vertical Engines and Boilers, 3 to 20 horse power.
Horizontal Engines and Boilers, 4 to 30 h. power.
Ingersol Rock Drill and 50 ft. of Hose.
Hoisting Machines, stationary and portable.

A. G. BROOKS & WINEBRENER,
261 North Third St., Philadelphia.

FOR SALE,

Job Lots and Bankrupt Stocks Hardware.

Great bargains offered to the trade.

A. W. WHEELER,

141 Lake St., Chicago, Ill.

FOR SALE.

Steam Engine, 6 x 15, with 15-horse-power boiler, feed pump and heater, nearly new and in good order. Two (2) second-hand "Peck" Drop Lifters, not geared; will raise hammers of 350 lbs. weight each. Second-hand sheet metal or poppet drop, 16 in. die space, good order.

BEECHER & PECK,
Lock Box 122, New Haven, Conn.

Just Published.

STEEL:

Its History, Manufacture, Properties, and Uses.

By J. S. JEANS,

Secretary of the Iron and Steel Institute.

Section I. *History of Steel:* Chap. 1. History of Steel; 2. Early History in England; 3. Progress of Invention; 4. History of Bessemer Process; 5. Siemens-Martin Process; 6. Other Steel-making Processes; 7. Steel in America; 8. Germany; 9. France; 10. Austria; 11. Russia; 12. Sweden; 13. Other Countries.—Section II. *Manufacture of Steel:* Chap. 14. Cementation and other Methods; 15. Manufacture by Bessemer Process; 16. Siemens-Martin Process; 17. Other Methods.—Section III. *Chemical and Physical Properties of Steel:* Chap. 18. Phosphorus in Steel; 19. The Use of Manganese; 20. Spiegeleisen; 21. Sulphur in Steel; 22. Silicon in Steel; 23. Tensile Strength of Steel; 24. Mechanical Tests of Steel; 25. Analysis of Steel.—Section IV. *Uses of Steel:* Chap. 26. Application of Steel to Railway Purposes; 27. To Shipbuilding; 28. To Bridge Building; 29. To General Purposes; 30. Guns and Armor Plates; 31. Other Purposes.

Price.....$14.50

For Sale by

DAVID WILLIAMS,
83 Reade St., New York.

MAGNETIC IRON MINE FOR SALE.

On Lake Champlain, immediately adjoining Cheever Ore Bed, at Port Henry. Apply to

GEORGE G. SAMPSON,
58 Pine St. (second floor), New York.

CUTLERY.

Having successfully established some of the most prominent Cutlery works in the States, and recently returned from my native town, Sheffield, England, I am open for an engagement to establish other Cutlery works in any of the States, East, West, South, California or Canada. Address

SAMUEL MASON,
Woodbury, Litchfield Co., Conn.

For Sale.

A stock of General Hardware, with dwelling, if desired. Autumn trade will be large. The banner county of Minnesota. Crops are heavy; the opportunity No. 1.

Address J. S. WHEELER,
Luverne, Rock Co., Minn.

WANTED—A situation as Furnace Builder or Foreman of Mason Work in a Rolling Mill, by a practical man who thoroughly understands furnace building and boiler setting in all its details. Satisfactory reference. Address MASON,
Office of *The Iron Age*, 83 Reade St., N. Y.

For Sale.

TWO VALUABLE PATENTS.

1st. For Improvement in Roller Skates.
2d. For Improvement in Carpenters' Chisels.

Terms to suit purchasers. For details, address

CHAS. E. L. JELLEFFE,
99 Nassau St., New York.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, September 1, 1880.

The market during the past week has been quite active—more so, in fact, than for some time previously. The leading features have been the strength of government bonds at about the highest prices, an irregular stock market till near the close and strong coal stocks. The ruling rate for call loans was 2 @ 3%. The closing quotations for call loans at the Stock Exchange this afternoon were 2 @ 2½%. The highest rate to-day was 3%.

Government 4 per cents sold up to 110 @ 110⅛. On Wednesday of last week the Treasury accepted $2,500,000 bonds for the sinking fund, all 5s or 6s of 8880–81. The total offerings amounted to $7,122,350. State bonds have been dull and steady. Government bonds at the close were strong at the present extreme advances.

The stock market has been alternately strong and weak; the general market early in the week advanced ¼ @ 3%, led by the coal stocks. In exception, Erie, Lake Shore, Michigan Central and New York Central declined 1 @ 3%. Later the whole market declined ¼ @ 4¼%, the latter Nashville and Chattanooga. On Monday afternoon the downward tendency was checked, and afterward prices advanced ¼ @ 7¾%, the latter Burlington and Quincy. The special feature of the stock market at the close was Hannibal and St. Joseph, the common advancing 1% to 43¼, and the preferred ¾% to 85½. The remainder of the general list advanced ⅛ @ ⅜%, including Panama 1½%, the latter having sold at 191½. The active stocks for the day were Erie, Hannibal and St. Joseph, Wabash, Lake Shore and the coal stocks.

In railroad bonds the largest transactions continue in Erie seconds, new consolidated, which advanced to 87 and then declined to 86⅛, and later advanced to 86¾.

The following is a comparison of the averages of the New York banks for the past two weeks:

	August 21.	August 28.	Comparison.
Loans	$310,666,300	$310,738,100	Inc. $71,800
Specie	66,717,300	65,413,800	Dec. 1,303,700
Legal t'nd'rs.	15,254,200	15,335,500	Inc. 81,700
Tot. reserve.	81,971,700	80,749,300	Dec. 1,222,400
Deposits	293,615,100	296,422,900	Dec. 2,192,200
Reserve required	74,653,775	74,105,725	Dec. 548,050
Surplus	7,317,925	6,643,575	Dec. 671,350
Circulation	19,425,100	19,356,800	Dec. 31,300

The foreign trade movements for the week are shown in the following tables:

IMPORTS

For the week ended August 28:

	1878.	1879.	1880.
Dry goods	$1,706,822	$2,122,158	$3,276,162
General mdse.	3,225,478	4,390,177	5,435,021
Total for week	$4,932,300	$6,512,315	$8,711,183
Prev. reported	181,862,642	196,694,766	320,454,648
Since Jan. 1	$136,794,942	$203,207,081	$329,165,831

Included in the imports of general merchandise for the week were articles valued as follows:

	Quantity.	Value.
Brass goods	11	$945
Bronzes	25	3,192
Chains and anchors	16	987
Copper	..	3,786
Cutlery	185	60,943
Pins	32	1,917
Guns	123	20,948
Iron, pig, tons	4,677	129,762
Railroad bars	21,397	197,757
Iron cotton ties	4,453	17,834
Iron ore, tons	3,583	9,011
Iron, other, tons	11,503	329,291
Lead, pigs	920	3,897
Metal goods	248	21,267
Nails	14	1,500
Needles	16	4,498
Old metal	..	5,226
Plated ware	4	125
Percussion caps	77	6,358
Saddlery	4	417
Steel	3,427	45,416
Silverware	5	1,000
Tin, boxes	35,961	172,588
Tin, bbls	25	1,070
Tin, 3,069 slabs; 353,270 lbs	..	84,278
Wire	3	933
Zinc	11,025	557

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended August 31:

	1878.	1879.	1880.
For the week	$7,011,880	$6,211,377	$8,331,306
Prev. reported	216,311,605	204,867,363	258,573,017
Since Jan. 1	$223,323,485	$211,079,140	$266,904,323

EXPORTS OF SPECIE.

For week ended August 28:

Total for the week	$191,135
Previously reported	5,191,271
Total since January 1, 1880	$5,382,406

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. 6's 1880 registered	102¼	102½
U. S. 6's 1880 coupon	102¼	102½
U. S. 6's 1881 registered	104¾	104¾
U. S. 6's 1881 coupon	104¾	104¾
U. S. 5's 1881 registered	102⅝	102¾
U. S. 5's 1881 coupon	102⅝	102¾
U. S. 4½'s 1891 registered	110½	110⅝
* U. S. 4½'s 1891 coupon	110½	110⅝
* U. S. 4's 1907 registered	109½	109¾
U. S. 4's 1907 coupon	110½	110¾
U. S. Currency 6's 1895	125	—
U. S. Currency 6s 1896	126	—
U. S. Currency 6s 1897	127	—
U. S. Currency 6s 1898	128	—
U. S. Currency 6s 1899	129	—

* Ex-coupon.

The following were the closing quotations of active shares:

	Bid.	Asked.
Atlantic and Pacific Telegraph	43½	45
Alton and Terre Haute	19	22
" " Pref.	75	77
American District Telegraph	74	75
Burlington and Quincy	138½	138⅞
Bur., Cedar Rapids & North	65	68
Chicago and Alton	115	116
" " Pref.	125	—
Clev., Col., Cin. and Indianapolis	71½	72½
Chicago, St. Louis and New Orleans	38	39½
Chesapeake and Ohio	18¾	19
" " 1st Pref.	24	24½
" " 2d Pref.	19¾	20¾
Colorado Coal	24	24¾
Canada Southern	59	60
Climax	1⅞	1⅞
Central Arizona	8⅛	8¾
C. C. and I. C.	19½	19½
Central Pacific	74	75
Caribou	1⅛	1⅛
Denver and Rio Grande	71¼	71½
Delaware, Lack. and Western	89½	89⅝
Delaware & Hudson	84¼	84⅝
Excelsior Mine	—	15½
Erie	38⅜	38½
" Pref.	67½	68
Erie and Western	31½	32
Express—Adams	116	118
" Wells, Fargo & Co.	109	109½
" American	57¼	57¼
" United States	47½	47¾
Hannibal and St. Joseph	43	43⅛
" " Pref.	85	85¼
Houston and Texas	61	64
Homestake	30	32
Iron Mountain	56½	56⅝
Illinois Central	111	112
Indiana, Bloom. and Western	23	32
Keokuk and Des Moines	10	14
" " Pref.	23	28
Kansas and Texas	36⅛	36⅜
Lake Shore	106⅛	106¼
Little Pittsburgh	3¾	4
Louisville and Nashville	131	132
Marietta and Cincinnati Pref.	7⅛	—
" " " 1st Pref.	5¾	6¼
Michigan Central	94	95⅜
Manhattan Elevated	27½	27½
Metropolitan Elevated	89	91
Montauk Gas Coal	81½	82
Mobile and Ohio	23¼	23⅞
Nashville and Chattanooga	69	70
New Jersey Central	75¾	75⅝
Northwest	99¾	99⅞
" Pref.	119	120
New York Central	129¾	130¼
Northern Pacific	29½	30
" Pref.	52½	53
New York Elevated	111½	112
New Central Coal	27	28
Ohio	34¼	34½
" Pref.	71¼	—
" Central	21½	22½
Ontario and Western	24	24⅜
Ontario Silver	30	34
Panama	191½	200
Pacific Mail	39¼	39⅝
Peo., Dec. and Evans	24½	25½
Quicksilver	—	13½
" Pref.	51	55
Rock Island	114	114⅞
Reading	22½	23
St. Paul	87⅞	88
" Pref.	109⅝	110
San Francisco Pref.	45	47
" " 1st Pref.	77½	79
St. Paul and Omaha	42½	43
" " Pref.	82¼	82½
St. Paul and Duluth	25	30
" " Pref.	58	62
Silver Cliff	4	4⅛
Sutro Tunnel	1⅛	1¼
Standard	28	28¼
Union Pacific	93	93¼
Wabash	38¼	38½
" Pref.	68¾	69
Western Union Telegraph	103⅞	104

GENERAL HARDWARE.

Business continues active, and the trade in general feel encouraged at the outlook, which is bright with promise of a healthy fall and winter demand. Since our last writing several meetings of manufacturers have been held, resulting either in advanced prices or the confirmation of existing values.

On Friday last the Atlantic States Nail Association held a meeting in this city, when the base price for Nails was advanced to $3.25, net, subject to an allowance of 10 cents per keg on orders for 200 kegs and over. The demand for these goods is fairly active, and the new price seems to be fully sustained. We quote 10d. to 60d., $3.15 @ $3.25, net, according to quantity.

Meetings of the manufacturers of Augers and Bits and Chisels and Drawing Knives were held in this city to-day, at which previous prices were confirmed. The makers of Strap and T Hinges also held a meeting to-day, at which similar action was taken.

On the 25th ultimo the Tack Manufacturers' Association adopted the revised discounts which we print below, being advances over former prices:

DISCOUNT SHEET ADOPTED BY THE TACK MANUFACTURERS' ASSOCIATION, AUGUST 25, 1880, TO APPLY TO THE HARDWARE LIST OF APRIL 2, 1880.

	Dis. per cent.
Swedes Iron Tinned, Carpet, Upholster's, Gimp and Lace Tacks	35
American Iron Tinned Tacks	45
Upholst'ers' and Swedes Iron Tacks—all kinds	20
Gimp and Lace Tacks	20
Swedes Iron Hungarian Nails	20
American Iron Hungarian Nails	20
Cigar Box and Chair Nails	20
Basket Nails	15
American Iron Cut Tacks	20
Copper Tacks and Nails	25
Leathered Carpet Tacks	20
Finishing, Trunk and Clout Nails	15
Tinned Trunk and Clout Nails	20
Common and Patent Brads	10
Brush Tacks	10
Swedes Iron Machine Finishing Nails	20
Looking-Glass Tacks	20
Picture Frame Points	20

In addition to the discounts named above, an additional cash discount of 10 per cent. is allowed. A revised net price list of Shoe Nails was also adopted, to which the same cash discount of 10 per cent. applies.

The following circular was issued to-day:

To Dealers in Hardware.—GENTLEMEN: Our attention has been called to a circular, dated August 26, 1880, signed by Hiram Tucker, threatening to sue unlicensed manufacturers of Builders' Hardware and those buying goods from them, for making or selling goods finished as specified in certain letters patent he claims to own (that will expire next December). This Mr. Tucker has for years past made the same threats against us, but, as we have used the same process we are now using since long before he claims to have invented it, we have always declined to take a license. In March last he finally fulfilled his threat, and brought suit for an injunction to stop our manufacture and sale. The Hon. Nathaniel Shipman, Judge of the United States Court for the District of Connecticut, assigned April 12 as the day for trial.

In the meantime we filed such, and so many, affidavits showing so clearly the invalidity of his patent, that his counsel asked for and obtained a postponement of the suit, to enable them to look and find something, if they could, in reply. But they could find nothing to weaken our proofs. Up to the day finally fixed for a hearing Mr. Tucker had failed to file a single affidavit in reply to ours, and the judge thereupon, on the 14th of June, 1880, gave judgment in our favor, and a decree was passed dismissing his motion for an injunction.

The object of this circular is to give notice to all buyers of our make of Hardware that, if Mr. Tucker carries out his threats against any of them and they will give us prompt notice of suit brought, we will assume its defense at our own exclusive expense, and will protect them against all damages and costs by reason thereof.

SARGENT & Co.,
Of New Haven, Conn., and New York.
September 1, 1880.

The Trenton Lock and Hardware Company, Trenton, N. J., have issued a descriptive catalogue of the specialties of their manufacture, in which they illustrate a good line of Door Locks and Latches, Rim and Mortise Door Knobs, Bell Pulls, Plain and Ornamental Escutcheons, and a large assortment of Keys and Door Trimmings. Among their miscellaneous Hardware we notice Brass Frame Pulleys, Barn Door Hangers and Rail, Sliding Door Sheaves, a good line of "Noiseless" Frame Pulleys, Hat and Coat Hooks and kindred goods. In Padlocks they show some fancy styles of Ornamental Bronzed, Malleable Iron Railroad, a large assortment of Scandinavian pattern, Brass Spring Padlocks, &c. Besides the specialties mentioned above, assortments of Door Bolts, Butt Hinges, Shutter Bars, Grindstone Fixtures, &c., are presented. We print below their discount sheet, issued under date of 1st instant:

DISCOUNT SHEET OF TRENTON LOCK AND HARDWARE CO., TO APPLY TO 1880 CATALOGUE OR TO CATALOGUE OF '78, WITH SUPPLEMENT OF 1880.

Page of Catalogue.	Discount.
10 to 83, Locks, Knobs, Escutcheons, &c	50
84, Porcelain Knobs and Hooks	50
84A, Ship Locks	20
84B, Ship Knobs and Rings	20
84B, Brass Frame Pulleys	20
85, Barn Door Hangers and Rail	25
86, Sliding Shutter and Door Sheaves	40
86, Sliding Door Rail	40
87, Philadelphia Hanging Sheaves	25
87, Wrought Way for Hanging Sheaves	25
88, Noiseless Pulleys	30
88A, " Nos. 6, 7, 8 and 9	50
88A, " (Brass No. 836, see page 84B	
88B, Noiseless Pulleys	50
88C, "	30
88D, "	30
90, Wardrobe and Hat and Coat Hooks	40
90A, Hat and Coat Hooks	40
90A, Clothes Line Hooks, change list No. 356 $10.75; No. 358, $11.25	40
90B, Bird Cage Hooks	40
91, Harness Hooks	40
91, Sash Centers	40
91, Drawer Pulls	33⅓
91A, "	45
92, Ornamental Bronzed Padlocks	45
92A, " " "	45
93, " Light " "	40
92&92 A, Padlock Keys	45
93, " "	40
94, Iron Spring Padlocks	50
95, Malleable Iron Spring Padlocks	40
96&97, Malleable Railroad Padlocks	40
98, Jail or Scandinavian Padlocks	50
98A, " " "	75&10
98B, " " "	70&10
99, " " "	60&10
100, Store Door Rabbeted Hasps	60&10
101 & 102, Brass Padlocks	40&10
102A, Drawer Locks	25
102A, Cut Cupboard Locks	25
102B, Ornamental Wardrobe Locks	33⅓
103, Japanned Wardrobe Locks	25
104, Wrought Shutter Bolts, No. 60	52½&10
104, " " " No. 65	50
104, " " " No. 70	50&10
104, " " " No. 75	45
104, Wrought Square Bolts	40
104A, Brass Knob Shutter Bolts	50
104B, Dark Bronzed Chain Bolts	20
104B, Bronzed Metal Chain Bolts	33⅓
104C, Dark Bronzed Bottom Bolts	20
104C, Bronze Metal Bottom Bolts	33⅓
104D, Dark Bronzed Chain Bolts	20
104E, Dark Bronzed Foot Bolts	20
104F, Light Bronzed Chain Door Fasteners	40
104G, Dark Bronzed Chain Door Fasteners	40
104G, Bronze Metal Chain Door Fasteners	45
104H, Cast Tower Bolts	50
104H, Cast Barrel Bolts	50
105, Flush Bolts, No. 15	55
105, " " No. 20	50
105, " " No. 10	50
106, Hinge Nails	15
106, Hinge Rivets	40
106, Wrought Hooks	25
107, Hooks and Staples	25
107, Meat Hooks	33⅓
108, Whistles	33⅓
109, Narrow Fast Joint Butts	45
110, Broad " "	45
111, Narrow Loose Joint Butts	55
112, Broad " "	55
113, Mavers' " "	55
114, Surface Blind Hinges	30
115, Loose Pin Butts, No. 33	55
115, " " Japanned, No. 35	55
115, Loose Pin Butts, Japanned, Plated Tips, No. 37	55
116, Loose Pin Bronzed Butts, No. 43	45
117, Loose Pin Solid Bronze Butts, No 53	45
118 & 119, Gilfillan's Patent Spring Hinges	25
120, Gate Hinges	45
121, Shutter Bars	40
122, Sash Fasteners, Nos. 3220 to 3233	40
122, " " No. 3234	40
122, " " Nos. 3242 and 3244	50
122, " " No. 3268	40
123, Bronzed Sash Lifts	40
123, Bronze Metal Sash Lifts	40
123, Bronzed Shutter Knobs	40
123, Bronze Metal Shutter Knobs	40
124, Cupboard Latches	40
124, " Bolts	40
125, Japanned Door Buttons, Plain	20
125, " " on Plates	27½
125, Cupboard Catches	45
126, Screen Door Catches	40
126, Closet Catches	40
127, Screw Pulleys	50
128, Side Pulleys	50
128, Upright Pulleys	50
129, Shutter Stays, change list No. 75, $7.50; No. 85, $8.50; No. 95, $16.50	40
130, Chest Handles, Japanned	50
130, " Brass, change list No. 2710, $10; No. 2711, $15	20
130, Chest Handles, change list No. 2810, $12.50; No. 2811, $13	20
131, Hay Fork Pulleys	30
132, Well Wheels	20
133, Thumb Latches, Nos. 1510 to 1512	55
133, Store Door Latches, No. 1521	45
134, Barn Door Latches	45
135, Door Pulls, Nos. 5, 7	40
135, " Dark Bronzed	40
135, " Bronze Metal	40
136, Grindstone Fixtures	25
137, Iron Quoits	25
137, Brass "	20
137, Trap Door Rings	45
138, Pocket Knives	33⅓
139, Ice Creepers	20

Terms cash. On all goods described on pages 10 to 103 a discount of 2 per cent. will be allowed if paid within thirty days from date of invoice. After thirty days, subject to sight draft.

W. K. Ross, No. 97 Chambers street, illustrates, in an advertisement on the 19th page, a good assortment of Scythes manufactured by the Mascoma Edge Tool Co., and Scythe Snaths made by G. W. & M. L. Stearns, both of which concerns are represented by him.

We invite attention to the advertisement of Hundley & Hanks, 79 Reade and 97 Chambers streets, proprietors of North Carolina Handle Works, which appears on the 28th page. Since last season they have added to their assortment a good many new patterns of Handles and Spokes. They carry a full stock of Handles, &c., at their warehouse in this city, and make a specialty of goods in their line suited to the requirements of the export trade.

W. & B. Douglas, Middletown, Conn., have placed on the market a new Automatic Pump, which is described and illustrated in their advertisement on the 7th page, to which the notice of the trade is invited.

Stuart, Peterson & Co., Philadelphia, whose works were seriously injured by fire on the morning of the 25th ultimo, announce in a card to the Stove and Hardware trade that their works are again in operation. We invite attention to their advertisement, which appears among "Special Notices" on the opposite page.

The Tuttle Mfg. Co., of Naugatuck, Conn., are represented in this city by Geo. B. Turrell and Chas. X. Cordier, at Nos. 87 Chambers and 69 Reade streets.

The attention of the Hardware trade is invited to the advertisement of the "Ideal" Coffee and Tea Pots, which will be found on the 28th page. The manufacturers say of these goods: "The 'Ideal' Coffee and Tea Pots are simple in construction, pretty in design, highly polished, and made of the very best imported tin, in the most careful manner. There is nothing to get out of order, and they are as reasonable in price as any other pot in the market." They are manufactured by the Ideal Coffee Pot Co., No. 622 Filbert St., Philadelphia, and, we are informed, are having a large sale.

The manufacturers of Wrought Butts held a meeting in this city to-day. Prices remain as heretofore.

BRITISH IRON MARKET.

[*Special Report by Cable to The Iron Age.*]

LONDON, Wednesday, September 1, 1880.

Scotch Pig.—The strike among the miners still continues, and there are now but 32 furnaces in blast. Prices during the week have fluctuated in both directions, but the market is now steady, with a fair business doing. The following are makers' quotations:

Gartsherrie	62/
Coltness	62/
Glengarnock	58/6
Eglinton	55/6

This is a reduction of 1/ in Eglinton and 6d. in Gartsherrie and Coltness. Glengarnock remains as quoted last week.

Manufactured Iron—Continues quiet, with unchanged quotations. Best Staffordshire Bars, £8.

Steel Rails.—There is no special feature to note this week. Prices remain as last week, viz., £6. 10/ for Ordinary Sections.

Iron Rails.—The market is very dull, there being no demand whatever.

Old Rails—Are in good request, and the moderate offerings are taken as soon as offered. We quote Old Ts, £4.

Scrap.—The offerings are light and sales fair. Wrought is quoted at £3. 17/6.

IRON.

American Pig.—Sales are reported during the week of 3000 tons Gray Forge and 1000 tons No. 2 X, both on private terms. The tone of the market is healthy and firm, and although the inquiry is not generally spoken of as active, still there does not seem to be much pressure to sell, and prime No. 1 continues in light supply. We repeat former quotations, viz.: Foundry No. 1, $26 @ $28; Foundry No. 2, $23 @ $24; Gray Forge, $21 @ $22. A sale is reported of 200 tons No. 1 Foundry (a Lehigh brand) at $28.

Scotch Pig.—The condition of the market has undergone little, if any, change since our last writing, and the sales have been lighter than usual. In lots we hear of about 600 tons various brands changing hands on private terms. We quote Eglinton $22.50 @ $23; Coltness, $25 @ $26; Glengarnock, $24.50 @ $25, and Gartsherrie, $24 @ $25.

Rails.—Steel Rails are quoted at $60 @ $63, and Iron, nominally, $47 @ $50. For the former the inquiry continues active, but no transactions worthy of mention are reported.

Old Rails.—Considerable business in Old Rails is reported, but particulars are withheld. We quote: Ts, $28, and D. H., $29, from store.

Scrap.—We hear of the sale of 400 tons No. 1 Wrought Scrap, from yard, at $28, and quote the same $27, ex ship, and $28, from yard.

Manufactured Iron.—The demand for Bars and Structural Iron is active and prices from store are tending upward. For Refined Bar, from store, 2.6¢ is the current quotation.

METALS.

Copper.—During the week under review the market has been quiet, but firm, with a little more inquiry, sales amounting to 100,000 pounds Lake Superior at 19¢. The asking price at the close is 19⅛¢. We hear per cable that Chili Bars have receded in the London market to £61 10/, while Best Selected remains £67. No news of importance has reached us from Valparaiso, either per cable or mail. It is to be presumed that now that Chili will have to raise another army of 20,000 men or more, Copper miners will have to be drafted to some extent, and more so than before. "London, Aug. 21.—According to the Board of Trade Returns, the total imports and exports into and from this country for the first seven months of the following years were:

Imports.	1878. Tons.	1879. Tons.	1880. Tons.
Copper and ores	7,464	4,017	7,653
Copper regulus and precipitate	10,048	16,168	16,701
Bars, cakes and ingots	21,882	27,322	23,250
Inpyrites (estimated)	8,886	7,203	10,698
Total	50,280	57,710	58,302
Exports.			
English copper, wrought and unwrought	18,547	18,089	17,630
Foreign copper, unwrought	6,989	9,582	9,401
Yellow metal	8,932	10,104	9,071
Total	34,468	37,775	36,092

More in sympathy with other metals than from anything else, the Copper market has this week assumed a stronger and more favorable position, and prices have again fully recovered all they lost last week; and while prices of Iron and Tin continue to rise, it is not unlikely that Copper may also display a hardening tendency, although not warranted by any improvement in statistics. The bi-monthly returns, published last Saturday, showing the stock of Chili produce in first and second hands in Liverpool and Swansea, are unsatisfactory, as they show an increase for the first fortnight of August of no less than 1320 tons, thereby bringing the total stock to 33,468 tons, against 32,148 tons on the 30th ult. This increase is caused chiefly by the heavy imports—being 2379 tons, against 1052 tons for the same time last year." Manufactures remain as under: Bottoms, 31¢; Braziers, according to size, 28¢ @ 34¢; Circles, 31¢ @ 34¢; Segment Sheets, 31¢; Fire-box Sheets, 28¢; Sheathing, 26¢; and Bolt Copper, 28¢.

Tin.—Our market has ruled very quiet, and lower prices have been accepted in a few instances, but no large transactions have taken place. London has declined with Straits Tin to £87. 10/, while Singapore cables $27 per picul. Imports in August at New York and Boston foot up 700 tons. The stock here is estimated at 1800 tons. Holders are in expectation of more doing during the month just begun, and they also seem confident as regards the course of prices. We quote at the close, large lots: Straits, 20¼¢; Australian, 20½¢, and Billiton, 20¼¢. "London, August 21.—The market has again taken an upward turn, and speculators are actively engaged in making fresh contracts, the turnover at times being very large and at improving prices. Operators appear very sanguine of the future, and much higher rates are expected shortly to be realized. On Monday the market opened at £87. 10/ for foreign, and advanced to £88, and 5/ more was obtained on Tuesday. On Wednesday business was done chiefly betwixt £89 and £90, and yesterday numerous transactions were reported between £90. 10/ and £92. 5/, according to prompt, while to-day business is recorded chiefly from £92. 5/ to £91. 5/. Violent fluctuations may continue to characterize this market, but operators consider it very unlikely that any serious fall will be made in prices for some time hence, providing monetary affairs continue easy." *Tin Plates* have been inactive, but there is an undertone of strength, based on expectations of a good run of business as we proceed. The market on the other side is again reported firmer per cable. Charcoal is there quoted 18/6 @ 19/ and Coke Tin 17/. We quote at the close, large lines, ordinary brands, per box: Charcoal Bright, $6.50; ditto Ternes, $6; Coke Tin, $5.37½; and ditto Ternes, $5.25.

Lead.—This metal has relapsed into a quiet state, but nevertheless remains tolerably firm at 4.95¢ @ 5¢ for Common Domestic and 5¾¢ for Refined, without anything transpiring in either. "London August 21.—This market remains steady, and prices are fairly maintained; in only a few instances are sellers reported to have made slight concessions, and a moderate demand exists for consumption and shipment." Manufactures are quoted as follows: Sheet Lead, 7¢; Lead Pipe, 6½¢; Tin-lined ditto, 15¢, and Block Tin Pipe, 40¢.

Spelter and Zinc.—The same listless state of affairs previously reported continues to prevail unbroken, the quotation for Common Domestic being nominally 5¢, and for Silesian 5¾¢ @ 6¢, according to quality. "London, Aug. 21.—Sellers are scarcely so firm in their quotations, and slightly lower rates are quoted, foreign Spelter selling at about £17. 15/ @ £18 in the Thames."

Antimony.—The market has been dull, but steady, Cookson being worth 17¢, and Johnson & Hallett 16¼¢.

COAL.

The end of August has come and the circulars for September are out. Most of the changes to be noticed are in the domestic Coals, which are advanced in price. The manufacturing Coals, however, show very little change. The trade is comparatively quiet, and the general report from dealers is that they have as many orders as are necessary to keep them going through the whole month of September. It is a significant fact that most of these orders have been taken at the lower figures. The proportion which will pay the full rates is infinitessimal. Many of the orders were given in anticipation of an advance. It is easy then to understand how prices can be put up when there is no Coal to be marketed. This is a favorite dodge with the trade. Mr. Saward says: "It will take at least ten days for the trade to find out whether the free-burning Coals can be taken at the September price list." In other words, it is estimated that at least ten days are needed to work off the present orders. It would be surprising if a much longer time were not needed to get rid of all the old orders and show clean books.

The Pennsylvania Coal Company make a new circular for September, in which Lump and Broken are quoted at $4.30 at Newburgh; Grate, $4; Stove, $4.35; and Chestnut, $4. This Coal has an additional charge of 50¢ ₩ ton when delivered in New York. Some of the Lehigh companies have issued new circulars. The Lehigh and Wilkesbarre quote Lump, $5.25; Broken and Egg, $4.40; Stove, $4.45; and Chestnut, $4. These figures are for Honey Brook. The prices among some of the Lehigh people yesterday were reported to be higher, although there had been no new circulars made and no meeting held. The quotations talked of were $4.45 for Stove and $4.10 for Chestnut. These figures were given by parties who had no Coal to sell at any price. Scranton is quoted in the circular as follows: Lump, Steam and Grate, $4; Egg, $4.20; Stove, $4.45; Chestnut, $4.10. The Delaware and Hudson quote the same figures.

OLD METALS, PAPER STOCK, &c.

We have little change to note in Old Metals, quotations generally remaining firm. The demand for Paper Stock continues active, with a slight tendency to an advance in prices.

The purchasing prices offered by dealers for Old Metals are as follows :

Copper, heavy	℔.	$0.16	@ $0.16½
Copper Bottoms	"	.14	@ .14½
Yellow Metal	"	.08½	@ .09
Brass, heavy	"	.11	@ .11½
Brass, light	"	.09	@ .....
Composition, heavy	"	.14	@ .14½
Lead, heavy	"	.03¾	@ .04
Tea Lead	"	.03½	@ .03¾
Zinc	"	.03¼	@ .03½
Pewter, No. 1	"	.11	@ .12
Pewter, No. 2	"	.07	@ .....
Wrought Iron	ton	20.00	@ 22.50
Light do	"	11.00	@ 14.00
Stove Plate	"	10.00	@ 12.00
Machinery do	"	17.00	@ .....
Grate Bars	"	7.50	@ 9.00

The prices current for Rags, &c., are as follows :

Canvas, Linen	℔.	3½c.	@ .....
White Cotton, New	"	3½c.	@ .....
" " No. 2	"	2½c.	@ .....
White, No. 1	"	3½c.	@ 4c.
" No. 2	"	2½c.	@ .....
Seconds	"	1½c.	@ 1¾c.
Soft Woolens	"	10 c.	@ .....
Mixed Rags	"	2 c.	@ 3 c.
Gunny Bagging	"	1¾c.	@ .....
Jute Butts	"	2¾c.	@ .....
Kentucky Bagging	"	4 c.	@ .....
Book Stock	"	2½c.	@ .....
Newspapers	"	1½c.	@ .....
Waste Paper and Scraps	"	½c.	@ ¾c.
Kentucky Bale Rope	"	4 c.	@ .....

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending August 31, 1880:

Hamburg.

	Quan.	Val.
Ptlm., gals.	258,350	$23,251
Glassw'e, cs.	4	257
Mach'y, cs.	35	5,668
Clocks, bxs.	19	228
Mf. iron, pkgs	283	2,180
Hdw., cs.	162	4,047
Sew. ma., cs.	697	14,703
Cutlery, cs.	3	375
Pltdware, cs.	1	54
Belting, cs.	3	352
I r goods, bls.	3	350

Bremen.

Ptl., gals.	1,214,620	116,839
Sandpaper, cs	1	50
Oil stones, cs.	7	300
Belting, bales.	3	656
Ag. imp., pkgs	18	275
Hdw., cs.	8	194
Ag. imp., pge.	1	110
Mach'y, case	1	100

Rotterdam.

Mach'y, cs.	15	600
Hdw., cs.	16	349
Glassw'e, cs.	1	98
Tin, slabs	3200	45,600
Clocks, bxs.	70	1,273
Mf. iron, pkgs	15	385
Lub. oil, bbls.	175	1,810
Wash. m'ch. cs	1	250

Stettin.

Ptlm., gals.	144,750	15,658

Danzig.

Ptl., gals.	221,766	21,500

Konigsberg.

Ptlm., gals.	93,100	10,901

Bergen.

Ptlm., gals.	120,750	12,075

Christiansand.

Ptlm., gals.	76,500	7,300

Elsinore.

Ptm., gls.	570,150	50,634

Rostock.

Ptlm., gals.	139,435	12,030

Russer.

Ptlm., gals.	108,872	9,998

Dutch East Indies.

Ptlm., gals.	295,000	36,875

Antwerp.

Belting, cs.	3	615
Teleph. mtl., cs	25	1,441
Sew. mach., cs	20	750
Clocks, cs.	35	565

Newcastle.

Hdware, cs.	1	40

Bristol.

Clocks, bxs.	6	62
Ox zinc, bbls.	100	950

Cork.

Ptlm., gals.	118,126	10,930

Gibraltar.

Tinware, pkgs	2	35
Hdw., pkgs.	3	117

British Possessions in Africa.

Ptlm., gals.	47,560	7,606
Hdw., cs.	358	6,134
Clocks, bxs.	59	1,070
Mf. iron, pkgs	27	155
C'rr'ges, pkgs	37	2,603
Slate, pcs.	38,011	1,030
Nails, kegs.	340	1,220
Belting, cs.	2	415
Iron safe	1	225
Tacks, cs.	1	15
Ag. imp., pgs.	218	4,417
Pumps, pkgs.	2	138
Glasswa'e, cs.	6	150

British West Indies.

Ptlm., gals.	19,891	2,568
Mach'y oil, gls	98	79
Refrigerator	1	78
Carriages	2	800
Tinware, cs.	5	35
Wire, spools	19	228
Nails, kegs	45	163
Glassware, cs.	15	119
Cge. mtl., pkgs	3	69
Hdw., cs.	17	185
Mf. iron, pkgs	6	102
Ag. imp., pgs.	4	30

China.

Hdw., cs.	1	44
Guns, cs.	3	190
Cartridges, cs	236	4,470
Pumps	1	73

Cuba.

Ptlm., gals.	10,250	1,416
Hoops	67,000	2,166
Wheels, prs.	150	1,500
Car mtl., pkgs	11	30
Glassware, cs.	53	634
Grindstones	106	30
Gas fixtures, cs	9	405
Nails, kegs	52	183
Clocks, cs.	2	33
Fire bricks	13,000	491
Coal, tons	18	125
Sew. ma., cs	6	90
Ag. imp., pkgs	9	331
Cars	7	150
Hdw., cs.	75	953
Mf. iron, pkgs	176	2,477
Mach'y, pkgs.	448	9,579
Tinware, cs.	5	53
Lamp gds. pgs	31	134
Iron, pkgs.	18	246
Mach'y, pkgs.	82	2,349

Venezuela.

Hdw., cs.	6	141
Cars	4	160
Emery cl'th, bale	1	48
Mach'y, cs.	1	75
Ptlm., gals.	8600	1,040
Mf. iron, pgs.	12	91

Messina.

Watches, cs.	1	25

Trieste.

Ptlm., gals.	165,611	16,360

Dutch West Indies.

	Quan.	Val.
Pltdware, cs.	1	$25
Hdw., cs.	17	186
Sew. ma., cs.	9	167
Copper, bbl.	1	50
Watches, cs.	1	48
Photo. mtls., pgs	2	42
Ptlm., gals.	6438	799
Tinware, cs.	4	47
Lamp gds. pge	1	25
Clocks, bxs.	3	37

Canada.

Glassware, cs.	4	137

British Honduras.

Cutlery, cs.	3	90
Ptlm., gals.	369	47
Hdw., cs.	18	140
Lamp gds pgs	6	53
Tinware, cs.	1	32
Sew. ma., cs.	2	94
Photo. mat., cs.	3	218

United States of Colombia.

Arms, cs.	6	2,020
Sew. ma., cs.	241	4,609
Tinware, pkgs	31	690
Mach'y, pkgs.	114	8,709
Lamp gds. pgs.	22	1,088
Belting, bales.	5	114
R.R. mts., pgs	7	534
Glasswre, pgs.	15	226
Ptlm. gals.	1840	353
Iron safes	2	226
Nails, kegs	18	56
Cartridges, cs	904	22,532
Yel. met., cs.	1	25
Photo. gds., cs	2	297
Hdw., pgs.	308	6,300
Pltdware, cs.	4	160
Cutlery, pgs.	42	3,382
Pumps, pkgs.	2	17
Clocks, pgs.	11	389
Car mtl., pkgs	28	240
Iron, pkgs.	121	1,429
Ag. imp., pgs.	28	395
Trucks, cs.	1	22
Tacks, cs.	2	20
Revolvers, cs.	2	285
Mf. iron, pgs.	389	6,236
Gas fixtrs., cs	1	42
Slate, cs.	2	25

Dutch Guiana.

Hardw., pgs.	12	165
Slate, pcs.	12,000	480
Ptlm., gals.	2000	300

British North American Colonies.

Ptlm., gals.	4016	382
Glasswe, pgs.	8	60
Coal, tons	1070	4,275
Mf. iron, pkgs	7	73
Pig iron, tons.	80	2,835

British Guiana.

Ptlm., gals.	5000	625

Havre.

Hdw., cs.	118	3,084
Sew. mach., cs	51	1,897
Axles	136	453
Nails, bxs.	22	128
Glassw'e, cs.	27	290
Sandp'p'r, pgs	7	80
Ag. imp., pgs.	17	1,320
Ptlm., gals.	127,823	9,107
Lub. oil, bbls.	105	2,084
Clocks, bxs.	35	494
Nails, kegs	12	30
Cutlery, cs.	10	715
Brs. g'ds, pgs.	6	123

Santander.

Mach'y, pkgs.	3	350

Palma.

Ptlm., gals.	65,280	6,015

Marseilles.

Ptlm., gals.	170,031	13,283
Ore, tons	90	1,500
Coal, tons	30	161
Mf. iron, pkgs	9	117
Iron safe	1	1,000
Ag. imp., pgs.	102	350

Bilbao.

Ptlm., gals.	111,000	13,000

Barcelona.

Ptlm., gals.	53,530	2,906
Ag. imp., pgs.	3	15

Porto Rico.

Ptlm., gals.	9280	1,153
Nails, kegs	351	1,124
Tacks, bxs.	6	41
Hdw., cs.	119	1,534
Mach'y, cs.	37	1,049
Clocks, cs.	7	145
Glassware, cs.	25	239
Sew. ma., cs.	8	136
Pumps, pgs.	3	47
Scales, pkgs.	19	200
Iron tank	1	250
Carriages	3	846
Cart	1	30
Mf. iron, pgs.	120	1,170
Pltdware, cs.	1	300
Ag. imp., pgs.	45	879
Iron safe	1	300
Cge. mtls., pgs	43	165
Grindstones	100	224
W. closet	1	63

Constantinople.

Ptlm., gals.	282,780	34,390

Alexandria.

Ptlm., gals.	168,380	33,676

Oporto.

Ag. imp., pkge	1	5

Palermo.

Type writ'rs, pgs	2	120

Genoa.

Pumps, pkgs.	16	1,300
Hdw., cs.	8	91
Mach'y, cs.	1	74

Hayti.

Pumps, pkge.	1	51
Mach'y, pgs.	5	248
Surg. insts., cs.	1	75
Saddlery, cs.	2	215

	Quan.	Val.
Iron, bdls.	15	$40
Zinc, cask	1	41
Carriage	1	275
Nails, kegs	102	328
Cutlery, cs.	20	428
Hdw., cs.	41	674
Revolvers, cs.	1	218
Mf. iron, pkgs	36	40
Velocipedes	8	66
Clocks, cs.	4	40
Cart	1	68

Mexico.

Cutlery, cs.	14	860
Cartridges, cs.	11	343
Arms, cs.	2	560
Revolvers, cs.	2	692
Sew. ma., cs.	140	3,274
Mf. iron, pkgs.	306	2,652
Glassware, cs.	47	738
Pistols, cs.	1	127
Iron safe	1	72
Cars	2	2,989
R.R. mtls., pgs	15	581
Carbines, cs.	1	174
L'mp gds. pgs	10	180
Clocks	9	134
Tacks, cs.	2	44
Hdw., cs.	172	4,915
Pumps, pkgs.	9	495
Mach'y, pgs.	291	9,477
Nails, kegs	45	147
Ag. imp., pkgs	7	87
Instmnts., cs.	1	74
Saddlery, cs.	1	81
Bronze, cs.	1	100

Cisplatine Republic.

Ptlm., gals.	125,000	16,000

Sandwich Islands.

Clocks, bxs.	3	88
Phot. g'ds, cs.	1	126
Arms, cs.	1	30

Brazil.

Petlm., gals.	52,740	6,956
Irons, cs.	120	660
Ag. imp., pgs.	4	363
Sew. ma., cs.	54	1,614
Mf. iron, pkgs	35	572
Mach. oil, gals	150	104
Nails, kegs	100	306

	Quan.	Val.
Nails, bxs.	8	$45
Hdw., cs.	145	2,867
Cutlery, cs.	22	1,185
Tacks, cs.	14	102
Mach'y, pkgs.	32	1,075
Arms, cs.	2	180
Cge. mtl., pkgs	19	855

Liverpool.

Lub. oil, bbls.	125	1,160
Watch mtl., cs	1	1,000
Carriage	1	400
Ag. imp., pgs	172	11,676
Pltdware, cs.	1	75
Sew. ma., cs.	30	626
Cop. ore, sacks	57	200
Harness, cs.	1	115
Clocks, bxs.	28	3,940
Hdw., cs.	99	3,546
Mach'y, cs.	26	2,530
Belting, bales	2	590
Mf. iron, pgs.	15	290

Hull.

Clocks, bxs.	110	2,105
Hdw., cs.	35	1,020
Ag. imp., pgs.	3	257
Pltd. ware, cs.	1	115
Mach., pkgs.	6	1,275

London.

Mach'y, pkgs.	56	4,303
Sew. ma., cs.	644	9,279
Refrigrs., pgs	17	600
Sp'lt'r, slabs	16,505	50,400
Lub. oil, bbls.	25	544
Clocks, bxs.	475	3,986
Plumbago, bls.	4	140
Mf. iron, pkgs	48	1,149
Plmbrs' mtls., cs	1	1,000
Printing press	1	2,100
Ag. imp., pgs.	95	5,660
Hdw., cs.	158	4,020
Wire, coils	8	150
RR. cars	2	1,900
Pumps, pkgs.	2	40
Silverw're, cs.	2	150

Glasgow.

Mf. iron, pgs.	4	216
Machy, cs.	3	805
Lub. oil, bbls.	12	300
Hdw., cs.	5	900

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending August 31, 1880:

Hardware.

Arnson & Whilzinski, Guns, cs., 6
Boker H. & Co. Cutlery, guns and hdw., pkgs., 208
Bloom W. Cases, 2
Cary S. Millstones, 718; Grindstone, 1
Drexel, Morgan & Co. Anvils, 146; Cases, 10; Casks, 2
Degraw, Aymar & Co. Chain, casks, 2; Chain, lengths, 2
Fuller Bros. Razors, cs., 3
Folsom H. & D. Arms, cs., 7
Graeff Cutlery Co. Mdse., pkgs., 7; Cutlery, cs., 5
Heidelbach & Co. Arms, cs., 6
Hartley & Graham, Per. caps, cs., 6
Merchants' Dispatch Co. Gun caps, cs., 7
McCoy & Sanders, Mdse., pkgs., 13; Hdw., pkgs., 33
Moore's J. P. Sons, Gun caps, cs., 7; Mdse., pkge., 1
Moses & Cohen, Cutlery, cs., 2
Moss F. W. Files, cks., 3
Putney D. Gun barrels, cs., 7; Arms, cs., 4
Rosenfeldt Bros. & Co. Cases, 4
Rejall & Becker, Cases, 5
Schoverling & Daly, Arms, cs., 47; Cases, 11; Cask, 1
Struller, Lau & Co. Arms, cs., 19; Caps, cs., 9
Sitzler F. & L. Guns, cs., 50
Witte J. G. & Bros. Guns, cs., 11; Cutlery, cs., 19; Casks, 2
Order, Arms, cs., 24; Cutlery, cs., 13

Iron.

Amsinck G. Scrap, lbs., 114,000
Bank of Rio Janeiro, Scrap rails, 408
Baring Bros. & Co. Pig, tons, 900; Wire rods, coils, 2665; Wire, bdls., 480
Brown Bros. & Co. Gal. wire, cks., 52; Bars, 1904; Wire rods, coils, 3048; Scrap rails, pcs., 7570
Breckner & Evans, Wire netting, rolls, 80
Corner Bros. & Co. Scrap, tons, 12
Coddington S. B. & Co. Sheet, bdls., 158
Drexel, Morgan & Co. Pig, tons 1000; Ore, tons, 363
Hernsheim L. Pig, tons, 20
Harrison W. G. Scrap, lots, 2
Irwin R. & Co. Pig, tons, 250
Jarnell Ennis, Ore, tons, 250
Leeds Mfg. Co. Machy., cs., 10
Lundberg G. Pieces, 1450; Scrap, boxes, 240; Bars, 255
Lee James & Co. Pig, tons, 600
Litchenberg C. Machy., pkgs., 2
Marvel W. D. Ore, tons, 650
Mayer Bros. & Co. Rails, 708; Scrap rails, kilos., 48,395
Milliken & Smith, Wire, bdls., 1988; Pig, tons, 10
Mason J. W. & Co. Wire rope, coils, 33
Perkins Livingston & Post, Spiegel, tons, 1000
Perkins & Choate, Cast, tons, 230; Spiegel, kilos., 150,000
Saxton & Seabury, Machy., cs., 21
Williamson Jas. & Co. Pig, tons, 200
Order. Wire rods, rings, 664; Wire rods, pkgs., 1684; Specular, lots, 1; Cotton ties, bdls., 16,615; Tons, 900; Machy., cs., 67; Rods, lots, 240; Scrap rails, 25,421; Cast, cs., 342; Pig, tons, 2287; Spiegel, tons, 653; Spiegel, kilos., 1,424,991; Scrap, tons, 466; Rails, 3946; Ore, tons, 2729; Scrap rails, tons, 2135; Bars, 20,280

Metals.

Amsinck G. Scrap cop., bbls., 20; Scrap cop., cs., 3
Baring Bros. Tin plates, bxs., 1710; Tin plates, 1172
Byrne Jos. & Co. Tin plates, bxs., 1050
Coddington T. B. & Co. Tin plts., bxs., 60
Cort N. L. & Co. Tin plates, bxs., 1505
Dickerson, Van Dusen & Co. Tin plates, bxs., 7007
Elwell F. W. & Co. Brass, cs., 2
Hibbard, Spencer & Co. Terne plts., bxs., 560
Jackson, R. D. Bar tin, bbls., 12
Kinney & Lea, Scrap, cks., 2
Kearney H. Scrap cop., bbls., 2; Scrap brass, bbl., ½
Lamarche H. Zinc, casks, 65
Pratt Chas. & Co. Tin plates, bxs., 600
Phelps, Dodge & Co. Tin plates, bxs., 15,068; Black tag., bxs., 110
U. S. Stamping Co. Tin plts., bxs., 607
Windmuller L. & Roelker, Zinc, casks, 10
Order, Tin plts., bxs., 29,871; Ingots, 25; Tin slabs, 3479; Tin and terne plates, bxs., 1855; Antimony, casks, 34

Steel.

Abbott J. & Co. Cases, 18
Brown Wm. Bundles, 357; Cases, 3
Baltzer & Lichtenstein, Blooms, pkgs., 2461
Carey & Moen, Rods, bdls., 266
Long J. S. Casks, 13
Moss. F. W. Bundles, 107; Bars, 28
Myer, Strouse & Co. Casks, 41
N. Y. National Banking Association, Steel tubes, 154
Prosser Thos. & Son, Mdse., pkgs., 29; Bars, 4; Bundles, 15; Tires, 28
Woodford W. O. Cases, 10; Bundles, 408; Bars, 19
Order. Bundles, 312; Cases, 31; Blooms, 1582; Rail ends, 200; Scrap tires, 1312; Rails, 1568; Cases, 16; Scrap spring, tons, 48½

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., Philadelphia, September 1, 1880.

Pig Iron.—The market is about the same as last week, although there is, perhaps, less difficulty in placing orders than there was a few days ago. Prices are about the same, and it has not been found necessary to lower quotations on best brands, but other descriptions are in moderately large supply and can be had at inside rates. There is still a good deal of doubt in regard to the ultimate course of the market ; some predict another "boom," while others appear to expect a slight reaction and a settling down to about $25 for No. 1 Foundry Iron. So far as we can see, there is no immediate prospect of either prediction being fulfilled. Consumption is healthy, and for a while, at any rate, will probably show some little increase. It will not, therefore, be an easy task to swamp the market, although the present remunerative prices will tend to promote a liberal production and thus prevent any such "boom" as there was a few months ago. Neither can it be too strongly impressed upon the trade that, beyond a certain point, prices cannot be maintained for any length of time. Not only can foreign Iron be had in almost unlimited quantities, but the productive capacity of our own furnaces can also be increased to an extent sufficient, probably, to supply all legitimate requirements. The *Bulletin* of the American Iron and Steel Association, under date of September 1, publishes a very interesting statement showing the imports of foreign Iron during the year ending July, 1880, to have upward been of 750,000 tons of Pig Iron, 400,000 tons of Old Iron and 300,000 tons of Finished Iron—a total of 1,500,000 tons. This could be repeated during the next 12 months, and perhaps will be repeated if another "boom" gets fairly started. In the meantime, with a magnificent condition of business in nearly all departments, there is no excitement, and all the indications appear to favor a continuance of activity at near the present basis of values. Sales during the week have been at $26.50 @ $28 for No. 1 Foundry Iron ; $23 @ $24.50 for No. 2 Foundry ; and $21 @ $23 for Gray Forge. Charcoal Iron has sold at $35 for best quality of warm blast, and about $38 for cold blast. Scotch Iron is quiet and firm at $23 @ $24 for Eglinton and $25 @ $26 for Gartsherrie, and $20 @ $22 for No. 3 Middlesboro'; sales of large lots at about $21.

Muck Bars.—There is very little demand, but prices are unchanged and holders firm at $40, at mill, for best qualities.

Blooms.—There is a fair demand and prices are firm, as follows : Cold-Blast Charcoal Blooms, $70 @ $72 per ton of 2464 lbs. ; Run out Anthracite, $60 ; Sunken Scrap Blooms, $55 per ton of 2240 lbs.; and Northern Ore Blooms, $50.

Structural Iron.—There is nothing specially new to report ; manufacturers are well supplied with orders, and prices are steadily maintained. No heavy orders have been placed recently, so far as we can learn, but the current demand is sufficient to keep the mills actively employed. Some concessions may possibly be made on large lots, but general transactions are at about the following rates, viz.: Angles, 2.7¢ ; Beams, 3.1¢ ; Channels and Tees, 3.25¢.

Plate and Tank Iron.—There is no change in this department of the Iron trade ; manufacturers are pushed to make deliveries on orders already entered, and new business cannot easily be placed, especially for large lots. Prices therefore are firmly maintained, and the following may be regarded as fair quotations, viz.: Tank Iron, 3.2¢ ; C. No. 1, 3.5¢ ; C. H. No. 1, 3.75¢ ; Flange Iron, 4¾¢ @ 5¢ ; Fire-Box, 5¾¢ @ 6¢.

Sheet Iron.—An active business is again reported, and further improvement appears to be generally anticipated. A heavy business has already been done, and prospects for the fall trade are unusually promising. Prices are firm and seem like advancing. Small lots are already held at higher prices than here quoted, viz.:

Common Sheet, No. 25 to 28	4¾¢
Common Sheet, No. 22 to 25	4½¢
Common Sheet, No. 16 to 21	4¼¢
Best Refined ¼¢ @ ½¢ advance on the above.	
Best Bloom Sheets, No. 26 to 28	7¼¢
Best Bloom Sheets, No. 22 to 25	7 ¢
Best Bloom Sheets, No. 16 to 21	6¾¢
Common Red Plates, 3-16 to 16	3.4¢
Blue Annealed, 3-16 to 16	3.5¢
Best Bloom Galvanized, discount	25 %
Second quality, discount	35 %

Bar Iron.—There is scarcely anything to be said in regard to this department, except that there is a good healthy demand and prices are a shade stronger, although not quotably higher. Heavy orders for cars have recently been given out by several leading railways, and the demand for Bar Iron in this direction has therefore been unusually heavy during the past few days. Production is so large, however, that there is no difficulty in finding supplies at current rates, but it is not likely that the slightest concession would be made, and some manufacturers are firm, even at outside quotations. Taking everything into consideration, business may be said to be in an exceedingly healthy condition, consumption steady and increasing, prices uniform and fairly remunerative, and the outlook in all respects satisfactory and encouraging. Prices may be quoted 2.4¢ @ 2.5¢, and firm.

Steel Rails.—The market appears to fluctuate a good deal, if newspaper reports are correct. Sales are said to have been made as low as $58 by some parties, while it is certain that $65 has been paid for some weeks past for prompt deliveries. So much depends on the terms of purchase, as to payment and delivery, that $2 or $3 per ton may be made in the nominal rate without materially changing the actual quotation. We have reason to believe, therefore, that sales have recently been made at something below $60, cash on delivery, during winter or spring. As a rule, however, $62.50 @ $65 is asked for deliveries during September or the two following months and $60 for early spring, with possibly some further modifications for cash.

Iron Rails.—The market is a little quiet, and no new business of importance has been entered during the past week. There is still a good deal of inquiry, and sales are expected to be closed to a considerable extent during the coming month. Holders ask $47, at mill, for heavy sections, but it is likely some concessions will have to be made before heavy orders can be obtained. Light sections are in active demand and command $48 @ $50, and 56s, $46 @ $47 asked, with sales at $46.50 and $47.

Old Rails.—There has been a little more activity, and several sales of good-sized lots have been effected during the week. Prices are scarcely so firm, however, and business cannot be done at the extreme rates paid 10 days ago. Some large lots are still held at $28 and upward, but several sales have been made in lots of about 500 tons each at following rates : Flange Rails, $27 @ $27 25 and $27.50 ; Doubles, $29 ; and U Rails, $29.75, market closing a little easy at above rates.

Scrap Iron.—Prices are well maintained and sales have been made at full prices, viz.: Machinery Cast, $20 @ 21 ; Wrought, $27 @ $29.

Nails.—Prices have been advanced to $3.25, less the usual trade discount, and with light stocks are firm at the above quotation.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, Pittsburgh, Pa., Aug. 30, 1880.

The situation, so far as regards general business, is in a much more healthy and satisfactory condition than it was at this time last year. While there is an absence of the excitement which then prevailed, there is more real legitimate business. Goods, instead of being bought on speculation, are going into the hands of jobbers and consumers, and manufacturers will not, as was the case last year, be forced to compete with speculators and sell at or below cost of production. With the exception of the labor question, which is in an unsettled condition, our manufacturing interests generally are in a satisfactory state.

Pig Iron.—There has been an increased business during the past week, and, while prices have undergone no quotable change, a firm feeling obtains, and furnacemen generally appear confident of being able to realize better prices in the near future. Some of them appear to have forgotten the disastrous effects of getting prices too high last year, claiming that a further advance of from $3 to $5 per ton can be made without bringing them into competition with foreign Iron ; but in this they are mistaken. Several lots of the latter have been offered in this market within the past week, and at prices about equal to the present selling price of American. The consumption here in Pittsburgh is larger, if anything, than at any time during the boom, and this is almost certain to continue until the close of the year, as the mills are nearly all sold from one to four months ahead, and the demand for Foundry Iron is also increasing. As compared with other points, Mill Irons are too low in Pittsburgh, and an advance of a dollar or two per ton within the next week or so, especially for standard brands, is not improbable, as stocks in the hands of consumers are getting down, and will soon have to be renewed. Neutral Forge is being sold at $22 @ $24, according to quality ; Red Short at $25 @ $28—the latter for all ore, and Bessemer at $28 @ $30. Cold Blast Charcoal.—Last sales reported at $40 @ $41. No sales of Bessemer reported during the past week ; the last sale made public—a small lot—was at $30, 4 mos.

Manufactured Iron.—While some of our manufacturers report that there has not been so much inquiry the past week, they are all busy. Some of them have contracts booked sufficient to absorb their entire production until the 1st of January, and prices are steady but unchanged. Notwithstanding there has been considerable of an advance since the 1st of July, prices are still, it is claimed, relatively lower, as compared with the raw article. Advices from all points indicate a large consumption this fall, as, in addition to the requirements of railroads, both new and old, which will be large, the demand for general use will be unusually heavy. Merchant Bars still quoted firm at 2.25¢ rates, 60 days, 2 % off for cash ; Sheet, 3.80¢ @ 4¢ for No. 24 ; Plate and Tank, 3¢ @ 3.10¢ ; Hoop, 3.10¢.

Nails.—There is an increasing demand. Orders are coming forward more freely, although business is still backward as compared with what it should be, and usually is at this season of the year. Prices remain unchanged—$3, 60 days, with an abatement of 10¢ per keg on car-load lots, and 2 % off for cash.

Wrought Iron Pipe.—There is a continued active demand. The mills are all very busy, and prices are firm at the advance noted last week, 65 % off regular list. Boiler Tubes, 45 % off. Oil Well Casing, 75¢, net ; do. Tubing, 20¢ @ 22¢, net. Notwithstanding the very unsatisfactory condition of the oil market, there is still considerable inquiry for Casing and Tubing, and the demand for Tank Iron has been unusually brisk.

Railway Supplies.—There have been no recent sales of Steel Rails reported this week, in consequence of the mills being sold so far ahead that they do not care to make additional contracts. Some mills have sold pretty largely for 1881. Spikes are still quoted at 2¾¢, 30 days ; Fish Bars, 2¼¢ ; Track Bolts, with Square Nuts, 3½¢ @ 3¾¢ ; ditto, with Hexagon Nuts, 4¢ @ 4¼¢.

Steel.—There is no abatement in the demand for Merchant Steel ; orders are coming forward quite freely and prices are steady. Buyers, who held off and bought very sparingly for a time, under the impression that prices would go lower, are now ordering freely, and an active, healthy business is being done.

Scrap.—There is an increasing demand, and with light stocks prices are firmer, but not quotably higher. No. 1 Wrought, $28 @ $30, net ; old Railway Car Springs and Axles, $33 @ $35 net ; Axle Turnings, $20 @ $21 ; Old Car Wheels, $33 @ $35, gross ; Cast Borings, $14 @ $15, gross ; Old Scrap Metal, $20 @ $21, gross.

Window Glass.—There has been very little change in the situation during the past week. Business continues slow and unsatisfactory. No change in prices.

Coke.—This interest presents no new or important features. There is a continued steady demand, and notwithstanding the production is large, being estimated at 25,000 or 30,000 tons per week, there is no accumulation and prices are fully sustained—$1.50 per ton, delivered free on cars at ovens. As a rule, makers are refusing to sell for delivery beyond 30 days at the quoted rate.

Petroleum.—The market for the raw article continues in an unsatisfactory and unsettled condition, and, so far as value is concerned, there is not much prospect of an early improvement. The great drawback is overproduction, and while it continues producers cannot reasonably look for much, if any, advance in price. But for speculation, it is doubtful whether the price could be kept where it is, in view of the production being so much in excess of the consumption and the visible supply steadily accumulating.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., Chattanooga, August 30, 1880.

Business, as usual with the week that closes a month, has been rather quiet since our last report. But its being quiet has not slackened prices of manufactured articles, which, in fact, have decidedly stiffened during the week. Judging by orders for future delivery, a very lively and profitable month's work will be done by manufacturers and dealers in September.

Pig Iron.—Trade has been fair, and considerable inquiries are coming in for lots to be delivered in September. The strength maintained by the market during a rather dull week shows that stocks are not heavy and that a small advance is probable. We quote same as last week : No. 1 Foundry, $24 @ $26 ; No. 2 Foundry, $22 @ $24 ; Gray Forge, $18 @ $20 ; White and Mottled, $15 @ $17 ; Car Wheel Metal, $40 @ $45.

Miscellaneous Articles.—Scraps are in fair supply and have a strong market. The same may be said of Old Rails, which continue strong in sympathy with Pig. We quote Wrought at $20 @ $24. Cast is worth $12 @ $15, according to quality. Old Rails are strong at $25 ; Old Wheels, $26 @ $28.

Ores.—There is no change in the Ore market ; the rates are firm. We quote : 50 % Brown Hematite, per ton, $2 @ $2.75 ; Red Fossil, $2 @ $2.25.

Nails—Are very strong. Round lots could not be placed at our figures. We continue to quote at $3.15 ; usual discount on 200-keg lots and for cash.

Manufactured Iron.—The Bar Iron market is as stiff and steady as that for Nails. Round lots are not obtainable at the quotations given. Millmen and dealers prefer not to make contracts for future delivery. Railway supplies throughout the entire list are in very satisfactory demand. We quote Bar at $2.35 rate; Railroad Spikes, $3 ; Track Bolts, $4 ; Trestle Bolts, $4.50 ; Fish Plate, $2.50.

Coal.—The Coal market is steady. We quote : $1.65 @ $1.75 for run of mine, delivered at mills ; Lump, 10¢ @ 12¢ per bushel, delivered.

Coke.—Improved and enlarged facilities for the production of Coke will eventually slightly reduce the price, though this market runs about with Pittsburgh now, our quotation, $3 at the furnaces, being about equal to $1.50 at the ovens. Foundry is worth 10¢ @ 12¢ per bushel.

Steel and Iron Rails.—The Rail market continues firm. There has been no advance. We quote Iron Bars at $46 @ $48 ; Steel, $60 ; Small T very strong at $55.

Lead.—We quote : Pig Lead, 4½¢ @ 4¾¢ ; Bar Lead, 5¼¢ @ 5½¢, with an improving demand. None handled here at wholesale except East Tennessee product.

Steel.—Plow Slabs, 3 in. and under, $4.70 ; Black Diamond, ordinary sizes, 13¢.

BOSTON.

August 28.—The market for Pig Iron is only moderately active, and there has been scarcely any change in tone or prices since our last. For *American Pig Iron* we quote $26 @ $28 for No. 1 X, $23 @ $24 for No. 2 X, and $21 @ $22 for Gray Forge. These prices are f. o. b. at the shipping port. Freights to Boston are $1.10. The spot prices of 10 to 50-ton lots of American Iron are $28 @ $30 for No. 1, and $26 for No. 2. *Foreign Pig* shows no change, and we quote Boston prices at $24 for Eglinton, $24 @ $25 for Glengarnock, $25 @ $26 for Gartsherrie, $24 for Carnbroe, and $22 for English. There are rumors, however, of some transactions at lower figures than those named. *Manufactured Iron* is in fair demand at firm prices. We quote Bar at 2⅛¢ @ 2½¢ for best refined and 2⅛¢ @ 2¼¢ for common ; Norway, $4.15 for Bars and $5.15 for Shapes ; Nails at $3 per keg. Plates at 3⅛¢ for Tank, 3⅜¢ for C. No. 1, 3¾¢ for C. H. No. 1 Shell, and 4¾¢ for C. H. No. 1 Flange. *Copper* is easier, and though the nominal price of Lake is 19¢, yet large lots are being bought at a lower figure. The jobbing price of Lake is 19½¢, and other brands 18¾¢ @ 19¢. *Tin* has dropped again, and while 21¢ is being asked for Straits, 20½¢ would probably purchase. In *Lead*, also, the late advance has not been fully sustained, and 5⅛¢ will purchase round lots in Boston. *Spelter* is easier, and we quote 5¼¢ for good sized lots of Western and 5¢ for Remelted.—*Commercial Bulletin.*

LOUISVILLE.

Messrs. Geo. H. Hull & Co., Commission Merchants, report to us as follows, under date of August 27 : The market continues firm, but without change in prices. Both the offerings and demands are light. We quote, for cash, as follows :

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$29.00 @ 30.00
No. 2 " "	27.00 @ 30.00
No. 1 Southern, Charcoal	26.00 @ 27.00
No. 2 " "	24.00 @ 25.00
No. 1 Hanging Rock, Stonecoal and Coke	26.00 @ 27.00
No. 2 Hanging Rock, Stonecoal and Coke	24.00 @ 25.00
No. 1 Southern, Stonecoal and Coke	26.00 @ 27.00
No. 2 " "	24.00 @ 25.00
"American Scotch"	25.00 @ 26.00
Silver Gray	22.00 @ 24.00
Scotch	30.00 @ 31.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neut'l.	23.00 @ 25.00
No. 1 Stonecoal and Coke, Cold-short and Neutral	23.00 @ 24.00
No. 2 Stonecoal and Coke, Cold-short and Neutral	22.00 @ 23.00
No. 1 Missouri and Indiana Red-short	27.00 @ 28.00
White and Mottled, Cold-short and Neutral	20.00 @ 21.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	40.00 @ 48.00
Alabama and Georgia, Cold-blast	40.00 @ 45.00
Kentucky, Cold-blast	40.00 @ 43.00

W. B. BELKNAP & Co., Iron and Steel merchants, Nos. 113 and 115 West Main street, report to us as follows, under date of August 28: Business is still brisk in all channels, and there is reason, after the advance in Pig Metal, to look for a stiffening in Bars; indeed, this may already be noted. It is a bad time to attempt to bear the market. The Ohio Falls Iron Works report orders enough booked to keep them busy a month, and note, specially, the unusual demand for large Rounds. As these go to the machine shops it is an indication of activity there. Nails are going off rapidly at steady figures. The jobbers of Building Material report a healthy state of affairs in their trade, with prospects of still heavier demand when cool weater sets in. One of the largest transactions in Iron ever made here was consummated a few days ago. The Louisville Car Wheel and Railway Supply Co. contracted with the Louisville and Nashville Railroad to furnish their car wheels for one year. The number of wheels estimated is 40,000. In return they take all the old car wheels from the road, and covered, besides, for about 3500 tons Pig Iron. The strike of molders at the Ohio Falls Car Works ended by the men yielding.

CINCINNATI.

Messrs. E. L. HARPER & Co., under date of August 30, write us as follows: The market has been steady, with demand fairly active and prices very firm. The heavy consumption continues, and there are no indications of any abatement, but rather of further increase. Buyers generally have only entered the market to cover their early wants, which will increase the fall business when it fairly opens.

FOUNDRY IRON.	4 mos.
No. 1 Hanging Rock Charcoal	$30.00 @ 31.00
No. 1 Strong Neutral Coke	28.00 @ 29.00
No. 1 American Scotch	24.00 @ 25.00
GRAY FORGE.	**4 mos.**
Neutral Coke	24.00 @ 25.00
Cold-Short	22.50 @ 23.50
CAR WHEEL AND MALLEABLE.	**4 mos.**
Hanging Rock, Cold-blast	46.00 @ 50.00
" Warm-blast	35.00 @ 40.00
Southern Car Wheel	41.00 @ 45.00
Maryland, Nos. 1 and 2	35.00 @ 36.00
" Nos. 3 to 6	38.00 @ 40.00
Lake Superior, Nos. 1 and 2	35.00 @ 36.00
" Nos. 3 to 6	36.00 @ 40.00

ST. LOUIS.

Messrs. CARD & HOFFER, Pig Iron and Iron Ore Merchants, 417 Pine street, write us as follows, under date of August 28: While we make no material change in our quotations—and there really is no quotable change to make—the market is exceedingly strong, and both makers and consumers are encouraged to hope for the best possible business in their respective lines at remunerative figures. In fact, the outlook is particularly promising, and the belief is general that we are entering upon a protracted season of prosperity, very pleasant to contemplate. We quote:

HOT BLAST CHARCOAL.	
Missouri	$28.00 @ 29 00
Southern	26.00 @ 28.00
Hanging Rock	29.00 @ 30.00
COKE AND COAL.	
Missouri	None offering
Southern	25.00 @ 29.00
Ohio	28.00 @ 30.00
MILL IRONS.	
Cold-short	24.00 @ 25.00
Red-short	26.00 @ 28.00
CAR WHEEL IRONS.	
Missouri	None offering
Southern	38.00 @ 42.00
Ohio	40.00 @ 48.00
IRON ORE.—Nominal.	
Ore for fix	10.00 @ 15.00
For furnace	6.50 @ 7.50
Brown Hematites	no market.

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of August 30: Trade rules, as reported last week, active and in every respect satisfactory; prices have a decided upward tendency, with values firm and stocks more or less broken.

Ref. Bar Iron, 1 to 6 by ¾ to 1	₩ lb	2½ @ 2¾¢				
" 1 to 4½ by 1⅛ to 2	₩ lb	2½ @ 2¾¢				
" ¾ to 2, Round and Square	₩ lb	2½ @ 2¾¢				
Hoop Iron, 1½ wide and upward	"	3½ @ 3¾¢				
Band Iron, from 1¼ to 4 in. wide	"	3 @ 3¼¢				
Horse-shoe Iron	"	3¾ @ 4 ¢				
Norway Nail Rods	"	6¼ @ 6½¢				
Black Diamond Cast Steel	"	13½ @ 14½¢				
Machinery Steel	"	9 @ 9½¢				
Cast Spring Steel	"	8 @ 8¾¢				
Common Horse Nails	"	10 @ 14 ¢				
Perkins' Horse shoes, ₩ keg of 100 lbs		$4.37½				
" Mule shoes		5.37½				
		10	9	8	7	6
Putnam Horse Nails	₩ lb	21	22	23	24	26¢
Globe Horse Nails	₩ lb	20	21	22	23	25¢
Railroad Spikes		3 @ 3¼¢				

Less list discount to the trade.

R. C. HOFFMAN & Co., Iron and Commission Merchants, report the Pig Iron market as follows, under date of August 30: The Iron market for the past week has been quiet, demand moderate, and prices ruling about as follows:

Baltimore Charcoal Wheel Iron	$40.00 @ 45.00
Virginia " "	40.00 @ 45.00
Anthracite No. 1	26.00 @ 28.00
" No. 2	24.00 @ 25.00
" No. 3	21.00 @ 23.00
" Mottled and White	19.00 @ 20.00
Charcoal C. B. Blooms	68.00 @ 70.00
" " Billets	68.00 @ 70.00
Refined Blooms	55.00 @ 60.00

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, August 15, 1880.—*Metals.*—The weather has been unfavorable to harvesting, still business has been satisfactory, and metals have further advanced. *Copper.*—In spite of the excessive visible supply, this metal has improved. We quote Chili bars, 162.25 @ 163.75 francs the 100 kilos.; Ingots and Slabs, 167.50; Best Selected, 170; and pure Corocoro ore, 167.50. *Tin.*—There has been a further notable advance, and we now quote Banca, 243.75; Billiton, 232.50; Straits and Australian, 236.25; and English, 235. *Lead* has again risen considerably; we quote the same here and at Havre, 41 @ 42. *Spelter.*—This metal has followed in the wake of the upward movement. We now quote the same 48 @ 48.50 francs. *Iron.*—The outlook is a little better. Some consumers have at length resolved to come out with their orders in this city, and the consequence is renewed activity. But in spite of all this prices do not improve; our city iron stores still sell to the consumer on the basis of 20 francs for Merchant Iron, and larger commands are filled even lower. The Northern Railroad Company has just bought of the Denain forges a lot of 100,000 tons of steel rails at 175 francs per ton delivered on board the cars at the works. This is a better price than the same concern recently obtained by its contract with the Western Railway. If the better demand now observable in this city continues a little longer, our dealers will be compelled to re-enter the market, and we shall then probably witness an advance in rates. The general aspect in the interior does not yet show any amelioration, nay, prices there may give way a little further even. *Coal* is in a better position than Iron; the arrivals, it is true, are large, but there is a good steady demand, causing great firmess and an upward tendency in view of the fall activity drawing near. This is so far as Paris is concerned. In the Pas-de-Calais, at the North and at St. Etienne there is as yet not much doing.

BELGIUM.

(Revue Universelle.)

BRUSSELS, Aug. 15, 1880.—*Iron.*—The Belgian Iron markets continue to improve. Merchant Iron and Sheets are in good request. We quote the former, 13 @ 14 francs, and Sheets, 18. Pig Iron is also quite firm; good brands of prime quality could not be procured for less than 6 francs, but the low grades may be had as low as 5 @ 5.50. Considering that we are in the midst of our national festivities, a fair amount of trade, indeed, has been transacted among us; not very large lots, but a steady run of minor ones have thus moved off, which is very satisfactory. The government is in the market for locomotives, ordering 50 at a time, and also wants 1000 cars, likely to be followed by an order for 3000 additional ones. Add thereto some orders for Iron Tubes for gas works, given by our city, and we have no reason to complain. We are glad to repeat that makers in Belgium have throughout met the market in a fair and liberal spirit. They have been content with living profits, and have thus throughout the usually dull summer months had a good run of business, which at present moderate rates may be prolonged through the remainder of the year. *Coal.*—The situation of this fuel remains satisfactory, and there are signs of great activity ahead. The range of prices at Charleroi is maintained for all qualities between 8 and 22 francs.

GERMANY.

(Borsenhalle.)

HAMBURG, Aug. 15, 1880.—*Iron.*—We have received the following from Dortmund: "Orders for Pig, Merchant and Sheet Iron continue dropping in with remarkable steadiness, without, as yet, increasing general activity very much. Our works are, however, by no means anxious to make contracts, at ruling rates, beyond six or eight weeks from date, for they expect better prices by that time, in view of the improved aspect abroad. The improvement in English and Scotch Pig, and in English Bessemer Hematite Pig in particular, can hardly fail to have a stiffening effect here, unless there be a recoil beyond the Channel in the mean time, which is hardly probable. Prices here have remained unaltered. *Coal.*—The better feeling which was obtaining here in July—rather unusually early—has, in a measure, disappeared again. This is due to the circumstance that customers at a distance begin to discover that the Coal combination is a mere humbug. At the same time, English Coal begins to compete very seriously with ours in Holland. Steamers now run between Hull and Amsterdam, making two trips per week each, by returning with water ballast." *Metals.*—Our market in general is rather firmer and higher. Lead has improved. We quote English Pig at 17.50 @ 18 marks the 50 kilos; English Sheet Lead, 17.80 @ 18.10; German, 17.50 @ 18, and Spanish, 19. Copper is firm, but no sales of importance have been effected. We quote Swedish Atvidaberg Ingots at 74; Drontheim Roraas Rosettes, 74 @ 75; English Refined, 68 @ 69, and ditto Sheating, 76. Tin is looking up. We quote Banca at 100 @ 103; Australian, 100 @ 102; English Common, 100 @ 102, and ditto Refined, 102 @ 106. Spelter is unaltered. We quote Silesian, spot and to arrive, 19 marks. Sheet Zinc, Silesian, usual numbers, 23.50 @ 24; Vieille Montagne Belgian, usual numbers, 24.20.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, Aug. 15, 1880.—*Iron.*—Although the Iron markets abroad have most of them upheld an upward tendency, we have remained rather apathetic here. This is due to the determination of Pig Iron producers to sustain ruling rates. But under hand they have no doubt made some concessions, and a good deal of business may thus have been transacted privately, which has not transpired. Latterly the Hungarian works, as we mentioned at the time, have been making very low sales; but they seem to take a different view now, and have ceased competing at ruinous rates with our blast furnaces. Our market, having got rid of this disturbing influence, will now return to steadiness, the situation will become a more clearly defined one, and business may be resumed on the basis of intrinsic values, of which we are glad. As a general thing the volume of dealings is moderate; the demand seems confined more exclusively to Merchant Iron and Sheets. The tendency, it cannot be denied, is one of firmness, and both in Austria and Hungary matters are getting smoother and more promising in the Iron trade. We quote: Pig in florins per ton, 54 @ 60; Gray ditto, 56 @ 62; Bessemer Pig, 65 @ 70, at the works; Merchant Iron here, 140; Bohemian and Hungarian, 120; Sheets for locksmiths, 170 @ 185; for Roofing, 185 @ 195; for Boilers, 170 @ 185; for Tanks, 155 @ 175, and Beams, 125 @ 127. *Metals.*—With the exception of the better demand for Lead we are witnessing the Metal market has shown few features of interest. We quote: Copper, 66 @ 78; Tin, 118 @ 120; Antimony, 85; Lead, 21 @ 23; Shot, 26 @ 28; Speiter, 23; Sheet Zinc, No. 9 to 26, 30; Brass, 45 @ 62; Nickel, 4.50 per kilo.; Bismuth, 12 per kilo.; Blue Vitriol, 30 @ 33; Minium, 29 @ 30, and Zinc White, 35 @ 45.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, August 17, 1880.—*Tin.*—There has been a fresh decline, bringing down Banca to 53.50 guilders per 50 kilos., and Billiton to 51.50, with very little doing.

CHILI.

(Ferrocarril.)

VALPARAISO, July 10, 1880.—*Copper.*—Early during the fortnight under review a few lots sold at $19.40 per quintal on the coast, but a great many holders declined to accept this figure; finally, however, the cable reported a decline in the London market, when owners began to show more readiness, and some business was done at $19, and a small lot even sold at $18.90 on the coast. Sales, 10,959 quintals at $18.90 @ $19.40. In Regulus nothing has transpired; $8.50 is offered. *Ore.*—The price offering for choice parcels is $3.50 for 25%. *Nitrate.*—Soon after the departure of the last mail an active demand set in and prices rose daily. The private production of Antofagasta sold on secret terms, supposed to have been $3.40 for 95%, at an exchange of 30d. The government has submitted a project to Congress proposing a uniform duty of $2 per metrical quintal of 100 kilos., payable in silver or its equivalent. This project will be extensively discussed and opposed. Sales, 182,500 quintals at $3.10 @ $3.60 for 95% and 96%. *Exchange.*—On London, 29⅞d. per dollar for 60 days, and 30d. for 90 days.

EAST INDIES

(Schmidt, Kustermann & Co.)

PENANG, July 7, 1880.—*Tin.*—The high prices paid just previous to the last mail's departure have not been sustained. Holders have been forced to abate somewhat in their pretentions. The market opened at $24 @ $24.50 per picul, and then advanced to $25 @ $25.10, at which figure moderate parcels were taken for India and China. The price then receded to $24.85, and closes to-day at $24.75. Sales embrace 3600 piculs for India and China, and 2200 piculs for Europe and America. Stock in bazar, 1600 piculs. *Exchange* was at first pretty steady, but a decline in the London market in silver caused a break, and we close with 4 months' bank bills, 3/9⅞.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., August 16, 1880.

THE OUTLOOK

has grown a trifle more promising since the date of my last letter, owing to the much finer weather and the impression that the harvest will have been most beneficially affected thereby. My own ideas on the subject of the harvest have not undergone the slightest change. A fortnight ago I traveled through several sections of the South of England, and the great majority of the crops I saw thereabout equaled anything I had seen for many years previous. I have no doubt, indeed, that the Kent and Surrey, Sussex and Hampshire farmers will find 1880 a long way ahead of anything since 1870, excepting one intermediate year. Since I returned from the South of England I have gone for some distance along the East coast—namely, Essex, Suffolk and part of Norfolk. The crops in the first of these three counties are being rapidly cut and got in. I should say the yield is about an average, both as to quality and quantity, although a few of the barley fields looked short and sour. In the remaining two counties there are several varieties of crops—some good, others indifferent. I saw none, however, at all approaching to the general wretchedness of 1879, and I should infer that the results this year would be fairly, even if not thoroughly, satisfactory. In saying this I discard a good deal of the humbug which is being written and spoken here on the subject, and rely upon my own powers of observation and experience—sharpened by the recollections of a boyhood passed in one of the best agricultural districts of the country. I do not know, nor can I conceive, why these ridiculously absurd statements as to the harvest have got so firmly rooted, unless it is that some of the farmers have set them afloat in the hope of inducing the "hard-hearted" landlords to keep the remission of rent system in vogue. In any case, a week or so of fine summer weather has done everything good, and has virtually saved us millions of money daily. With another such week or ten days we may snap our fingers at fate and make faces at Jupiter Pluvius. Whether for these reasons or otherwise deponent doth not pretend to say, but it is clear that the prospects of trade are steadily improving in all directions. The official returns of the Board of Trade (given in my last letter) amply demonstrate this fact to the full proof; yet there are still a number of thick-pated croakers who swear that the returns are unreliable, and that the actual facts of the case are not in accord with the figures thus put forward. It is of no use whatever to argue with persons of this class. It is of no avail to point out to them that the statistics of the Board of Trade are so compiled, by means of arrangements which cover every port in the United Kingdom, that collusion would be utterly impossible, and even if possible, *cui bono?* Who is to benefit by a general mass of tabular statistics which deal with all kinds of commodities? A single error might creep in, it is true, but it would be really impossible for any considerable mistake to be made. In spite of all these facts and inferences, there are a number of addleheads who aver that the returns are wrong and their own information accurate. They tell you that they themselves are not doing nearly so much; that Smith is very quiet; that Brown is fairly off, "but, then, we know how he gets his orders," &c. These worthy gentlemen forget or ignore the circumstance that, as time goes on, the circles in which trade revolves grow wider. Where there were two firms in one line of business 20 years ago, there are are now 20 or 30 in this country, to say nothing of the competition in the United States and abroad. The consumers have not increased in anything like the same proportion, or, if so, have learned the art of self-supply. Thus it is that the older firms never deem themselves busy unless they are working 10 or 12 days a week, as was the case when they had the monopoly in by-gone days, and, therefore, with them "trade is dull." I cannot account for the discrepancy in any other manner. Many persons of undoubted respectability and credence tell me that they "find things very quiet," both as regards orders and money; whereas, on the other hand, one can point to our vastly augmented railway earnings and dividends for the half year which has just ended, to the shipping and ports returns, as well as to the Board of Trade statistics. All these last testify to the steady growth of the trade movement of late. At Liverpool over 50 vessels were cleared out in one day last week, besides almost as many on other days—a state of things which the great Mersey port had not previously been able to boast for a long time. The railway dividends are almost all better, the Northeastern Company (serving the Cleveland iron and Durham, &c., coal districts) having paid 8 per cent., as against 4 per cent. a year ago. The returns of the Bankers' Clearing House point in the same direction. The amount cleared is much better, and there is already some discussion as to the possibilities of the money market, especially in respect of the bullion which may or not be required from the Bank of England for shipment to the United States. All these things—"yea, more"—plainly reveal the true direction of the commercial stream. A certain shrewd section of the Hawks are evidently quite clear on this head, for at no time since 1873 has the public company mania shown stronger signs of revival than at this juncture. There are now "in course of formation" all sorts of undertakings, all strictly on the "limited liability" principle, "acquiring and carrying on" every imaginable kind of business or speculation. The promoters are for the most part singularly bashful and retiring gentlemen, who seem to be so single minded and simple that they withdraw from the vulgar and inquisitive gaze of the common herd, and devote themselves to the sale of mines, works, dwellings, and so on, to the public at enormous profits, leaving but miserable pittances for themselves. I envy their modesty, and sincerely trust they *will* have their reward in due course. I think they will. Virtue *should* be its own reward. It was in the 1871-74 period. Those of the promoters who "got nothing" when their companies were launched before the public subsequently had their reward. Some of them got twelve months with hard labor, and others various terms of years. A few escaped scatheless. Let us pray that *they* may also be suitably recompensed. I deem it an unmistakable symptom of the revival of business when these vultures begin to darken the air. They are keen scenters of blood, and they know when to bleed. At the same time they are not honest scavengers, but rather despoilers who weaken their victims and so overflood the market with their projects that they hasten the inevitable end, and bring on the apparently unavoidable catastrophe which succeeds periods of prosperity. There is no law to prevent these rapacious schemes from being circulated, advertised and puffed, but it is generally felt that the multiplication of these adventitious aids to legitimate operations is not only most objectionable on economic grounds, but also a sign of the miserable gullibility and weakness of the investing public.

IN THE IRON TRADE

up to this these companies have not made any prominent reappearance, and if investors have any memories worth speaking of, the new race of promoters will appeal to them in vain. I am afraid, nevertheless, that any great "rush" or "boom" would speedily bring forth a flood of bogus concerns or rotten companies, formed with overloaded capital to buy up mines and works at present lying idle and hopelessly unprofitable. In the meantime the rush in question has not made its appearance, and the trade in which we of this journal are mainly interested is in a quiet condition. There is no weakness, and little or no hesitancy on the part of buyers; yet there is undoubtedly a certain amount of quietude current. It may be perhaps that much of this is attributable to the slack season of the year—when "all the world" has forsaken city and town, and is dispersed on moors and mountains, baths and seaside resorts. There is no doubt whatever that half the population of London and the larger manufacturing towns visit the country or the seabathing places between July 1 and September 1, and especially during August. Business is conducted in a somewhat perfunctory way, and there are so many persons out of town that there is a general impression that August is a dead month. We still keep moving, it is true, but there is a holiday feeling in the air which conflicts curiously with one's true business instincts and "sicklies o'er 'our great or little' enterprises with the pale cast of thought" in reference to the expected or just-over vacation. This might seem somewhat exaggerated to those unaware of the real facts, but I would ask doubters to run down to any watering place or health resort within 100 or 200 miles of the metropolis and note how many faces they know on the beach or promenade. Go to Brighton, Scarboro', Ramsgate, Hastings, St. Leonards, Margate (!), Yarmouth, Sandown, and you shall find your London iron and hardware men by the score, just as you shall find the men of Birmingham and Wolverhampton at Ilfracombe, Paignton, Torquay, Bath, Rhyl, Llanduduo or Bangor; the Sheffielders at Bridlington, Scarboro', Whitley, Redcar, Blackpool or the lakes; the Manchester and Liverpool men all over the coast. This annual exodus hampersbusiness during its continuance, notwithstanding the "run up to town" for a day or two each week indulged in by those who "*really can't* be spared, you know, altogether." In a few days subsequent to the close of this month I suppose the principal portion of the interregnum will have passed away, and we shall then be enabled to settle down again to regular work. Some of us will probably "sigh for our cool suits" again—but no matter! Just now the leading topic of conversation in iron circles is as to the probabilities of the Scottish miners' strike. It has lasted some weeks, and has entailed much loss upon the ironmasters and general consumers of coal, owing to irregularities and deficiencies, as well as higher prices. The miners are mostly those working in Lanarkshire, so that the ironmasters along the west coast of Scotland are chiefly affected by the dispute. The men base their application for an advance of one shilling per diem upon the rise in warrants, which the employers state has been largely brought about by speculation and has not done them much good. About 10,000 miners are out, and seem likely to remain so, inasmuch as the ironmasters have determined to damp down all the furnaces in the county, excepting those at which a wages sliding scale is in operation. Under this resolution about 50 furnaces will be thrown idle, reducing the average weekly output by between 9000 and 10,000 tons. Already, up to this writing, about 20 furnaces have been stopped. It is, of course, not improbable that this course of action may have the effect of improving Scotch iron prices, but to what extent and in what manner cannot as yet be clearly perceived. If the reduction of the make be kept up for any length of time, concurrently with a good shipping demand, a considerable rise would be inevitable. In Cleveland the trade is very steady, and the smelters are benefiting to some extent by the troubles of their brethren over the border. The hematite pig-iron producers of the west coast are doing a very satisfactory turnover, and are stated to be engaged for several months ahead. In Lanarkshire, Yorkshire and Derbyshire the majority of the works are pretty well engaged, and the autumnal prospects are understood to be satisfactory. Staffordshire is fairly off, but not wholly up to the mark, especially in the "best" departments. A change is looked for after the harvest. In Shropshire the wire, &c., works are moderately active, while in Monmouthshire and South Wales the run is chiefly on rails, bars, tin plate, sheets and plates. Prices are everywhere quiet and steady.

SCOTCH PIG IRON

is quiet at the moment, albeit it possesses sundry "elements of combustion" which may blow up prices any moment. At this date there are 100 furnace in operation, but under the ironmasters' resolution to reduce the make, the number in operation toward the close of this week may possibly not exceed 70. In Connal's stores the quantity of pig is 456,940 tons, against 291,796 tons a year ago—an increase of 1598 tons during last week. The total shipments of Scotch pig to date have increased 140,706 tons this year—last week's extra quantity being 4756 tons. The importations from Cleveland into Scotland are creeping up, the total quantity to date this year having been 142,216 tons—a decrease of 1934 tons as compared with the same section of 1879. It may be mentioned that the Lanarkshire furnaces which are to be damped down include Gartsherrie (14), Coltness (4 in), Summerlee (6 in), and others of note—*unless* other arrangements supervene. John E. Swan & Bros., Glasgow, quote ballast pig 49/ alongside ship. James Watson & Co., Glasgow, August 14, say: "The price of Scotch pig iron warrants has been lower since the date of our last, with a more limited business doing. On Wednesday the ironmasters resolved to damp down the furnaces in Lanarkshire rather than grant the 1/ advance to the men. It is impossible to say how long the struggle will continue, but it will be keen and determined. The demand for makers' iron has been quiet, and there is not much change in the quotations. On Monday the market opened at 54/, 1 month, declining to 53/3, cash, afterward rallying to 54/3, cash. On Tuesday the price was irregular, with a good business done between 54/6 and 54/1½, closing at 54/6 per ton. On Wednesday only a limited business was done between 54/4 and 54/10½, closing at 54/6, cash. Yesterday the market opened strong at 54/9, cash, but gradually gave way and closed at 54/4 per ton, while to-day it fluctuated between 54/6 and 54/, cash, closing at 54/3 per ton buyers, sellers asking 54/4½ per ton. The shipments last week were 12,260 tons, as compared with 7504 tons for the corresponding week of 1879. We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	55/6	53/6
Gartsherrie, at Glasgow	59/	55/6
Coltness, "	59/6	55/6
Summerlee, "	58/6	54/
Langloan, "	59/6	54/6
Carnbroe, "	58/6	54/6
Calder, at Port Dundas	58/6	54/
Glengarnock, at Ardrossan	57/	55/
Eglinton, "	57/	53/6
Dalmellington, "	55/6	53/6
Shotts, at Leith	60/	55/.

CLEVELAND PIG IRON

is remarkably steady at the subjoined rates, which are quoted f. o. b. Tees for G. M. B. at net cash:

No. 1 Foundry	48/6	No. 4 Forge	43/
2 "	46/	Mottled	42/6
3 "	43/6	White	42/
4 "	43/	Kentledge	42/6

Of the 18 works in the district 12 have every furnace at work. The shipping demand from Germany and Russia is very large and steady.

WEST COAST HEMATITES

are in good request; indeed, the producers might sell forward to a considerable extent if they were so disposed—which is not the case. The maximum furnace power of the district is in operation. Quotations are within 1/ or 1/6 per ton of the following figures:

	No. 1.	No. 2.	No. 3.
Cleator	85/	82/6	80/
Lonsdale	81/	80/	79/
Workington	81/	80/	79/
West Cumberland	81/	80/	79/
Lowther	81/	80/	79/
Moss Bay	81/	80/	79/
Harrington	81/	80/	79/
Solway	81/	80/	79/
Maryport	81/	80/	79/

HOTCH POTCH.

No especial news from Birmingham, Sheffield or Wolverhampton. Samuel Newbould & Co. (Limited) and Sanderson Bros. & Co. (Limited), Sheffield, have each declared a 5 per cent. dividend. What about the American Sanderson's Co.? Samuel Fox & Co. (Limited), near Sheffield, have made £25,714 profit on the year, and pay a 10 per cent. dividend. The Consett Iron Co. (Limited), Durham, have made a profit of £104,000 for the year, yielding a 30 per cent. dividend *and* a bonus of £2. 10/ per share. How is that for high these bad times? German scissors are not supplanting the same goods of Sheffield make. The "Sheffield water" maintains its supremacy over all rivals. German wire nails can be delivered in London 6/ a ton cheaper than Birmingham ones. There is a good demand for Staffordshire chains and traces on United States account. A firm of tin-plate merchants have "arranged" with their creditors; liabilities, £35,000. Large contracts for the Birmingham gas works have been given out; value, over £100,000. Steel, Tozer & Hampton are putting down the largest Bessemer plant in the Sheffield district.

Julius E. Braunsdorf, a well-known business man of this city for nearly 30 years, died suddenly of apoplexy at his residence in Pearl River, Rockland County, on the 23d ult., in his 51st year. Mr. Braunsdorf was a native of Germany. He came to this country about 30 years ago. He established himself in the furniture business in Rivington street. From there he removed to Elizabeth street, where he received as a partner Mr. Henry Weil, who was associated with him for nearly 20 years. The firm carried on a large wholesale furniture business, and afterward began the manufacture of the Ætna sewing machine, the Liberty printing press and later the American press, which was Mr. Braunsdorf's invention. Among the articles manufactured at his shops was an electric light apparatus, upon the perfection of which he devoted much time and labor.

The United Pipe Lines are negotiating for the purchase of a breech-loading cannon capable of discharging a 3-inch ball, and which will be kept in constant readiness to be removed to any section of the field where a large tank may take fire. The critical time at such fires is when the burning tank makes an overflow. By perforating the tank with solid shot, and drawing the oil off in that way, the flames can be prevented in almost all instances from communicating to adjoining property.

Our Trade with Austria-Hungary.

(*From Our Own Correspondent.*)

WASHINGTON, D. C., September 1, 1880.

Mr. Kasson, Envoy of the United States to the Court of the Austro-Hungarian Empire, arrived in Washington a few days ago on leave of absence. Mr. Kasson has been nominated for Congress by the Republicans of his district in Iowa, and it is his intention at the expiration of his leave to return to Vienna, settle up his connection with the legation and resign, to prepare for his new field of duty, as a nomination in his district is equivalent to an election. Mr. Kasson, in conversation with the correspondent of *The Iron Age*, gave a very interesting account of the condition of trade and manufactures in Austria-Hungary. The panic which commenced in 1874, he said, began to break in 1878, and by 1879 the trade and industries of the empire had fully revived. In 1878 the foreign commerce showed a more flattering condition of things than any other country of Europe, there being a balance of trade of some $50,000,000 in favor of the empire, and an increase of trade of $18,000,000 imports and $15,000,000 exports over 1877. The aggregate trade for 1878 was—imports, $239,353,000, and exports, $288,399,000. The American imports are agricultural implements, hardware, petroleum, tobacco, sewing machines, cheese, canned goods, hams and other products. A very large share of American articles, it appears, is received by way of Germany, which prevents the full extent of American trade with the empire being known. Mr. Kasson referred to the effect of the new Austrian tariff, which went into operation January 1, 1879. He says that it will materially diminish the trade in some of the leading imports from the United States, particularly in canned fruits, the duty on which is now almost prohibitory. Mr. Kasson alluded to a recent report from the American Consul-General at Vienna, Mr. Weaver, in which the effects of the tariff upon American goods were carefully discussed. On this subject Mr. Weaver says: "Notwithstanding the present high tariff on imports, great pressure is being brought to bear upon the Reichsrath for a further increase of duty upon certain American articles which, it is feared, may still come into competition with the home manufactures and products. In addition to this cry for protection from American meats, grain and petroleum, a very discreditable system of attacks through the press has been inaugurated against American salted meats and hams, such as was indulged in about a year ago in Germany. If Austria-Hungary requires a prohibitory tariff to exclude American meats and wheat from her own markets, what hopes can she entertain of being able to compete with the United States in markets outside of the empire, where no discriminating laws exist?"

The trade of Austria-Hungary is less understood by American merchants and manufacturers than that of any other country in Europe, and the Austro-Hungarian markets are, perhaps, surrounded with more intricacies and difficulties, so far as American exporters are concerned, than any other market in Europe.

Mr. Post, the late Consul-General at Vienna, submitted a report just before his retirement from that consulate-generalship, in which he dealt with the difficulties which our manufacturers must expect to meet and overcome in their efforts to introduce their manufactures into Austria-Hungary. It also explains the seemingly insignificant trade of the United States with that empire, by showing the large indirect imports of American goods *via* England, Germany and other countries. From this it would seem to be easily possible for our manufacturers to overcome these obstacles. From Mr. Post's report we make a few extracts specifically touching these points. It may be presumed that, in consequence of the isolation of Austria-Hungary, the principal part of the commerce of the United States is not carried on from its own ports on the Adriatic, but *via* Hamburg and Bremen, and thence overland through Germany.

At first, Mr. Post says, a ready market was expected in America for the fabrics of Austrian looms, in exchange for raw cotton, &c., but the possibility of manufactures coming to that ancient empire from a country which less than two centuries ago was a wilderness was more than Austrian notions could realize. The introduction of sewing machines was the entering wedge to overcome this unappreciative public sentiment. Hundreds of thousands of them have found a market in the empire, and have secured the confidence of the people to such an extent that even at this time sales of European imitations are rarely effected, except by representing them as genuine importations from America.

Mr. Post says: "The Vienna Exhibition of 1873 opened the eyes of the people of this country to the ingenuity of American inventions, and to the superiority of American tools and implements in lightness and finish, and the only objection then made was the price demanded for them. The events which gave a more stable currency and cheaper capital in the United States, with lower prices, silenced that objection and alarmed the manufacturers of this country, who thereupon demanded a revision of the Austro-Hungarian tariff, in order to protect home industries."

The great difficulty has always been to make known our manufactures, and to educate the people to appreciate their superiority, and that difficulty surmounted, those who are able to pay will not accept an inferior article because of so slight a difference in the price. Speaking of American articles Mr. Post says:

"American cheese, disguised under an English name, supposed to come, and perhaps actually brought, from England, is in general use. American leather, cotton belting, all kinds of manufactures of iron, from the smallest implement to the heavy machinery used in boring petroleum wells, are coming into this empire, and among the finest collections of glassware displayed for sale in this capital of a country famous for glassware, may now be seen a complete assortment conspicuously labeled 'American glass.'"

Further he says: "Our manufacturers have shown the greatest activity and enterprise, and have entered upon the business in that unostentatious and practical way best adapted to produce results with the least expense and risk, and without arousing the jealousy and hostility of rivals. One agent who visited the principal towns in this empire had with him 150 samples, and an examination of the illustrated advertisements and catalogues of one of the principal Vienna hardware merchants showed that, of 309 cuts, 212 were representations of American machines and tools, the remaining 97 being divided among English, French, German and Austrian machines. Merchants also prefer to sell a beautifully finished American article when they can do so for the same price that they can supply the coarser fabrics of Europe."

In this connection it should be added that at the Department of State the attention of our manufacturers and exporters is specially directed to that provision of the Austrian tariff under which 12 florins per 100 kilos. duty is charged upon iron and steel goods polished, japanned or enamled, or iron goods in connection with other materials, while but 8 florins is collected on iron and steel goods ground, varnished or painted, but neither polished, japanned nor enameled. The particular goods upon which one third of the duty can be saved by attention to this provision of the tariff can best be determined by the exporters themselves.

The Pulsometer.

About eight years ago C. Henry Hall brought before the public an entirely new style of pump, which attracted considerable attention and was rapidly accorded a prominent place. While it proved its efficiency in many instances, it was soon found that minor defects in detail of construction rendered it apt to work irregularly. Some years afterward it was brought out on the Continent and in England, where it gradually succeeded in securing a field. Quite recently it has again, in a modified form, claimed attention in this country, and it is to its present construction that we wish to refer. As the accompanying illustrations show, the principles underlying its construction remain the same, and it is chiefly in elaboration and better adaptation of detail that progress has been made. The "New Pulsometer" consists principally of two bottle-shaped chambers, A A Fig. 1, joined together side by side, with tapering necks bent toward each other. Attached to them by means of a flange joint, B, is a continuous passage from each cylinder leading to one common upright passage, into which a small ball, C, is fitted so as to oscillate with a slight rolling motion between seats formed in the junction. These chambers also connect by means of openings with the vertical induction passage D, which openings are so formed that the vulcanized-rubber valves E E and their seats F F may be easily inserted. The delivery passage H, which is common to both chambers, is also constructed so that in the openings that communicate with each cylinder are placed valve seats, G G, Fig. 2, fitted for the reception of the same style of valves as in the induction passage. I I are valve guards to prevent the valves from opening too far. To facilitate the ready removal of the valves and valve seats, it will be observed, the flanges that cover the openings are slotted to receive the bolts, the nuts of which being loosened, they are readily removed and the covers displaced; and to avoid rust, the set bolts fastening the seats, and the tap bolts holding the valves, are made of brass. J represents the vacuum chamber, cast with and between the necks of chambers A A. It connects only with the induction passage below the valves E E. K K are figures covering the openings to the respective chambers, which may be removed for the repair or renewal of valves and seats when necessary. Vent plugs are inserted into these flanges, for the purpose of drawing off the water to prevent freezing. A small brass air check valve, not shown in our illustrations, is screwed into the neck of each chamber, A A, and one into the vacuum chamber J. The check valve in the neck of each chamber, A A, allows a small quantity of air to enter above the water, to prevent the steam from agitating it on its first entrance, and thus forms an air piston preventing condensation. The check valve in the vacuum chamber J serves to cushion the water column, and prevents any hammering action.

The action of the pump is as follows: After the steam pipe at the top has been connected with the supply pipe, and the bottom with the suction pipe, and all the air check valves have been closed, the steam is admitted. It passes into whichever chamber the position of the small ball permits, and displace the air. The steam supply is then cut off, and the steam condenses on the walls of the chamber, forming a vacuum. This operation is repeated several times, expelling the air by steam, and the space within the chambers is filled with water through the induction pipe. It is then that the steam may be regularly admitted. Each air valve in the chambers is now opened just sufficient to secure a regular and continuous action, which will be recognized by the steady pulsation and smooth working of the steam ball without a rattle. As the steam enters the chamber directly above the water, it presses upon and forces it out past the discharge valve and through the discharge pipe with a velocity and force dependent upon the pressure of steam in the boiler operating it.

In its new form the pulsometer has been doing good work both abroad and in this country. It is particularly well adapted for muddy water, denser fluids, pulp, &c. For such liquids as are destructive to iron, it is made of metal capable of resisting their action. The pulsometer is portable, comparatively light, and can be easily applied under exceptional circumstances for temporary use. The lift naturally varies according to the nature of the fluid pumped, the situation of the pump, pressure of steam, &c. It is stated that the most favorable results on a total lift of 40 feet have been made with a pressure of steam of 25 pounds, and 70 feet with a pressure of steam of 40 pounds.

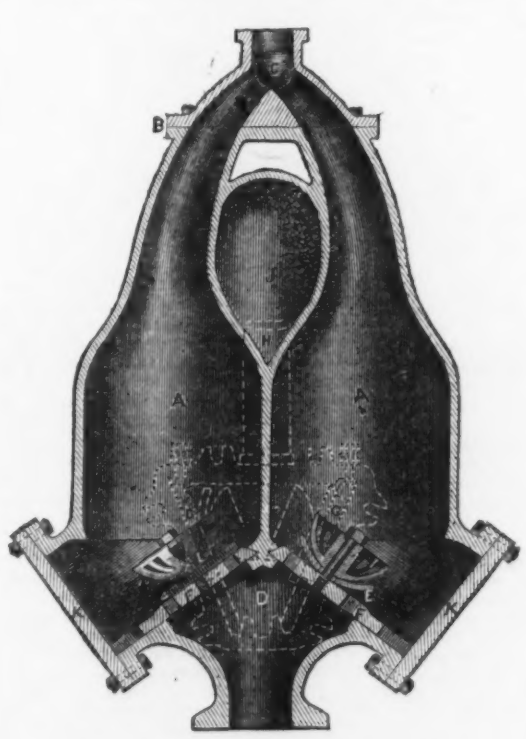


Fig. 1.—Vertical Section of Pulsometer.

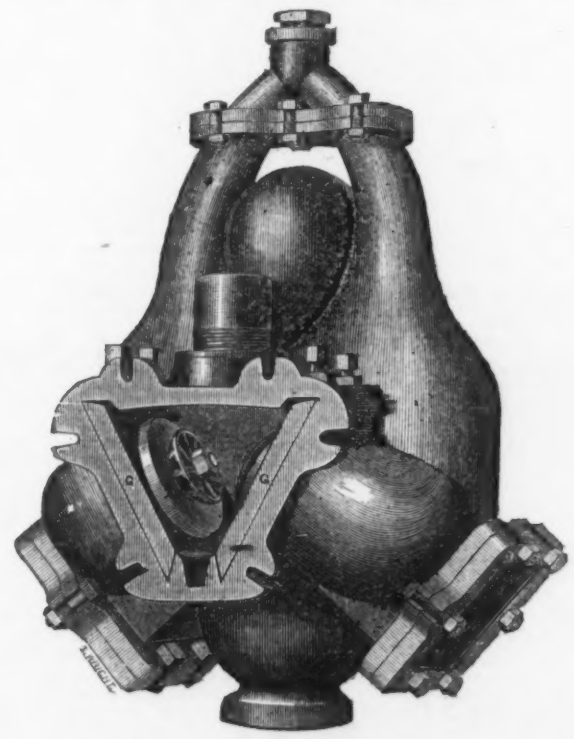


Fig. 2.—Elevation of Pulsometer.

The Tehuantepec Railroad.

The concession obtained from the Mexican government by Mr. Edward Learned, of Pittsfield, Mass., is fast maturing in results of the first commercial importance. Special care was first taken to see that all former grants for a railway across the Isthmus of Tehuantepec were extinguished. Then, under special privileges sanctioned by the Mexican Congress, Mr. Learned and associates proceeded to carry out the enterprise of uniting the two oceans by a railway to be 140 miles in length, having its eastern terminus at the mouth of the Goatzocoalcos River. Mr. C. W. Van Brocklin, formerly of the New York Elevated Railroad, is the resident engineer, from whom the accounts received are in all respects encouraging. Eighty miles of road have been located, and a line of railway more than 30 miles in length will be opened by the close of this year. The climate has not proved hostile, and while a part of the route is through rich sugar and coffee plantations, which the engineer compares to the open prairie lands of the West in the United States, there are other sections which are a dense forest jungle, but nowhere are there difficult excavations in rock or tunneling.

Large quantities of materials are being shipped. No less than five vessels have been chartered and dispatched from New York within the past month, viz., the ship Stonewall Brown, brigs Ramaries, Missatillan and Granada, and the three-masted schooner Brigadier, all of them taking out railway iron and supplies. The shipments comprise 1500 tons of steel rails received *via* Europe, and the full equipment will follow in regular monthly installments from the English manufacturers. The contract was made very favorably, just before the boom, the requirements being 56 pounds per running yard, delivered at Liverpool, of the first test, at the rate of 1000 tons per month. The July installment has been received, and that for August is now loading. All the spikes, fish plates, &c., are purchased in the United States.

The government of Mexico, at the last Congress, voted the appropriation of $75,000 per mile for the first section of six miles, at the same time conferring upon the treasury power to pay a like amount for the next section as soon as it is completed. The Tehuantepec Company were also notified that the $100,000 in silver dollars deposited as a pledge of good faith can now be withdrawn and replaced by $200,000 of the company's bonds, the property on the isthmus being ample security.

The Mexican government has acceded to every demand, manifesting a disposition to further the enterprise in every way in its power. This is in striking contrast with the experience of the Boston scheme, known as the "Mexican Central Railroad," to extend from the City of Mexico to the Rio Grande. According to recent advices, the latter find themselves unexpectedly embarrassed by former grants to other companies, which are still claimed to possess vitality, and a belief is expressed that the negligence thus indicated may prove fatal to the whole scheme.

On the Utilization of Coal Cinders and Clinkers in Building.

M. Noack-Dollfus has been considering the problem of the proper disposal of the waste arising from the combustion of coal in boiler and other furnaces around large manufacturing centers. He points out that in the neighborhood of Lyons, France, this substance has been turned to account as an economical building material, under the name of *pisé de machefer*, which may be rendered slag or clinker concrete. It differs, however, from concrete properly so called, in that that material, instead of being allowed to set in molds from a comparatively fluid condition, is rammed in a nearly dry state, as in the common cob or *pisé* work of the South of France, where ordinary earth or clay is used. In its preparation either ordinary, rich or hydraulic lime may be used, but the former is generally preferred at Lyons. The material best liked is the slag obtained in cleaning the furnace bars, which is in the form of porous, spongy masses of a density of about 0.9, but ordinary ashes, and more particularly the red ashes from boiler flues, may also be used. They have to be first carefully hand-picked to remove unburned coal or coke and friable particles which may be expected to crush in ramming, leaving only ashes and more or less vitrified slags. This work, usually done by women and children, is paid at Lyons at the rate of about 3/4 per ton.

The next operation is sizing through a riddle of about 1½ inch aperture, the larger masses being either reduced by the hammer or kept as such for foundation. It is important that the slags should not be reduced to too fine a state of division, as their absorptive power for carbonic acid, upon which the value of the result chiefly depends, is thereby greatly diminished. When pure lime is used, fine flue cinders are advantageous, as giving a slight hydraulicity to the mass. The lime must be carefully slaked and reduced to powder before use, care being taken to remove all unslaked lumps, as these become carbonated irregularly and produce craters or blow-holes on the surface of the finished work. The relative proportions of the two materials may vary from five to six parts by volume of cinders to one of lime, according as the latter is ordinary or hydraulic. The mixture is made by placing the lime in a depression in the heap of cinders, and working the mass together by an ordinary mason's rabble, sufficient water being added to render it slightly coherent when pressed, but it must not be sensibly wet to the finger. The compression of the materials is such that the volume of the finished work is about the same as that of the cinders used.

In foundation work hydranlic lime and large lumps of clinkers may be used, but, as a rule, masonry is preferable: the ramming must be very carefully done with light, strong wooden rammers of about 18 pounds weight. For walls above ground molds are used, made three planks high, about 32 inches in all, kept at the necessary distance apart by round struts of wood, and tied together by flat tie bars and cotters. These molds are generally similar to those used in concrete building, but their sides are a greater distance apart, the average thickness of the walls being about 20 inches. The rammer is a rectangular block of wood 16 inches high, 9 inches broad, tapering from about 16 inches wide in the middle to 2½ inches on the face, weighing 18 pounds or less, with a pole handle 34 inches long. Care must be taken in placing the molds that they are set perfectly upright; the work is done by gangs of five men, namely, two rammers—one having charge—two fillers and a carrier. The stuff is thrown in by basket loads of 30 to 40 inches in diameter and immediately subjected to an energetic ramming, care being taken to deposit each basket load at one spot, the rammer working backward until a layer of 7 or 8 inches deep has been finished along the face of the work. The horizontal courses are broken at intervals by joints made with ordinary or hydraulic lime mortar, inclined at about 60 degrees, the slope being in opposite directions in alternating courses. Small articles may be made in concentric cylindrical segments, but when they are of any size it is best to build them up in voussoirs, closed by a keystone, as in ordinary masonry.

The coal store of the Perrache gas works, at Lyons, is given as an example of this class of work applied to large buildings. This is 227 feet long, 62 feet broad, 32 feet high, and stows 5000 tons of coal. The proportion of lime to cinders used in the construction of this building was 1 to 4, the former being hydraulic. It has been in use about 10 years, and the walls, though penetrated by numerous openings and subjected to great and varying loads, have resisted admirably, not being cracked in any way. The same material has been used in the buildings of numerous glass and iron works in the same neighborhood, and has received other applications in the production of heavy square slabs for chemical works and artificial stone blocks. These are made of the ordinary mixture, with the addition of a little cement pressed in wooden molds into masses, which are dried in fine weather and then buried in the heaps of slag to season. A mixture of four parts of ordinary brick earth, with six of finely-powdered slags of a vitrified character, gives a plastic body, which, when molded, dried and strongly fired, gives bricks of a characteristic black color and great hardness, with a metallic ring when struck.

Prizes for Potters' Machinery.—At a recent meeting of the United States Potters' Association the following resolution was passed: "*Resolved*, That a reward of $500 be and is hereby offered to any person who may invent and offer to us any new and useful machinery of importance to us, applicable to our art and business; and that a reward of $250 be and is hereby offered by us to any person who may invent any essential and useful improvement to or upon any machinery now in use by us; provided that these inventions or improvements are free from all patents obtained or to be obtained from the inventor or any other person; and that a committee of three be appointed to investigate and test these inventions and improvements, and when, in their opinion, these rewards, or either of them, be fairly and fully earned, or if in their opinion a portion only of the above rewards be earned by the parties presenting them, the committee shall have power to draw upon the treasurer through the executive committee for such sum or sums as the committee may have agreed to, not exceeding the above-named amounts.

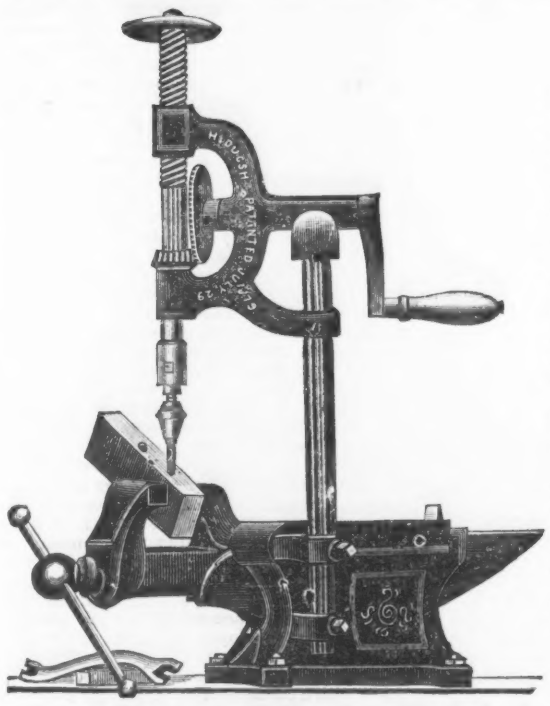
The Mail-Lock Contracts—The contracts for furnishing mail locks and keys as advertised for have been awarded by the Postmaster General as follows: To the Smith & Egge Manufacturing Company, Bridgeport, Conn., for iron mail locks and keys at 52 cents for each lock and 9 cents for each key; for city mail locks and keys at 34 cents for each lock and 9 cents for each key; for through mail locks and keys at 75 cents for each lock and 12 cents for each key; for inside locks and keys for street letter boxes at 85 cents each for locks and 15 cents each for keys. To the Western Lock Company, Geneva, Ohio, for padlocks and keys for street letter boxes at 50 cents each for locks and 9 cents each for keys. No proposals for the through registered mails were accepted.

English Co-operative Societies.—The capital of the original co-operative society in England, founded in 1844 with 25 members, is now $2,440,175; its membership, 10,429, and the profits for the last quarter, $66,385. in the last report to the government, which bears date 1878, 1289 societies in England, Scotland and Wales are mentioned. The aggregate membership of these is 554,773; the sales during the year amounted to the magnificent sum of $104,865,795, and the net profits, after paying trade expenses and interest on loans and capital to the amount of $7,361,355, amounts to $9,002,340. This result was accomplished on a share capital of $18,292,350, and loans to the amount of $4,288,835. In England all the money remaining after paying 5 per cent. on the capital, which is provided by the customers, and the working expenses of the store, is divided among the customers in proportion to their purchases.

The Philadelphia *Record* states that the Midvale Steel Works, located at the intersection of the Germantown and Richmond branches of the Philadelphia and Reading Railroad in Nicetown, are to be sold at auction on the 26th of October next. The sale is to satisfy a mortgage executed to E. W. Clark and Clarence H. Clark, trustees. The property will be struck off to the highest and best bidder upon signing the terms of sale and paying in cash the sum of $1000. The Midvale Steel Works were projected by Philip S. Justice and others in July 1866, under the title of the William Butcher Steel Works, with William Butcher as president and superintendent. In January, 1870, Samuel Huston was elected president, William Butcher retaining the superintendency. In October, 1872, the name was changed to Midvale Steel Works, and in the following August a new organization throughout was effected. Although the establishment of late years has been producing in all grades steel of a superior quality, the concern has never been a financial success.

The Geo. F. Blake Manufacturing Company, of this city and Boston, are engaged in building a duplex pumping engine of a daily capacity of 2,500,000 gallons for the city of La Crosse, Wis. Heretofore the city has simply owned its pipe system, all pumping for its water supply having been done under contract by the large saw mills located within its borders and vicinity. The city authorities, having decided to own and operate its pumping machinery, have contracted for a pumping engine, as above stated, which is to be completed about the 1st of December next. The Blake Company have also under contract and in process of construction a pair of pumping engines with a combined capacity of 1,500,000 gallons daily for the new water works now being built at Stillwater, Minn.

ANVIL, VISE AND DRILL.



This machine was first made by a practical mechanic for his own use, and to meet a want which nothing in the market would fill. It was so highly regarded by all who saw it that he was minded to get it patented and manufactured for the market. When it was brought to our attention we saw at once its great utility, and bought the exclusive right for the whole United States. We believe it will come into general use as fast as its merits become known. The anvil face is 4x8 inches, and hight 6 inches. Width of vise jaw, 3½ inches; steel drill press, with adjustable chuck to hold ½-inch drills, and all smaller sizes. The article to be drilled can be held firmly in the vise, so as to be drilled at any angle, or if it is too large for the vise it can be drilled on the anvil. The drill may be removed when not in use. Price for the whole, $18. Weight, 80 pounds. The vise and anvil are complete without the drill, and are sold for $10; weight, 60 pounds. For all jobbing shops, it is worth much more than it costs. Farmers can do with it many jobs which otherwise would have to be sent to the shops. All Hardware dealers who do not keep them in stock will furnish them on demand, or we will send them on receipt of the price.

MILLERS FALLS CO.,

74 CHAMBERS ST., NEW YORK.

HEATON & DENCKLA,

Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
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COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
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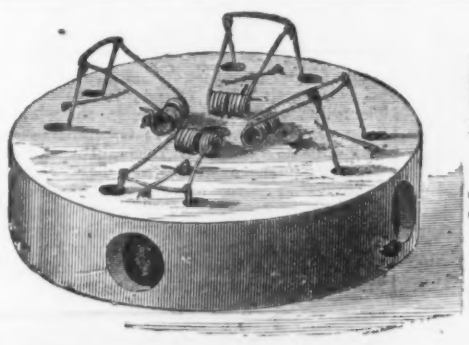
HUSSEY, HOWE & CO.'S Bar & Sheet Cast Steel.

Also a large line of Heavy and Shelf Hardware.



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MOUSE TRAPS,

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Lemon Squeezers, Mallets, Rosewood Faucets, Patent Boot Jacks, and Housefurnishing Ware.

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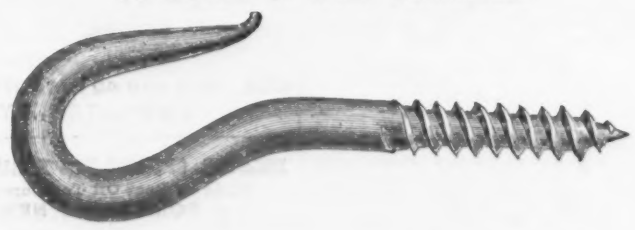
Providence. New York. Boston. Chicago.

GALVANIZED HAMMOCK HOOKS,

To Screw or with Thimbles.



Diameter	⅜	7-16	½
Price, per doz	$1.60	1.80	2.00

Price ⅜, 7-16, ½, all $1.75 per dozen.

A liberal discount to the trade. Send for a sample lot.

HENRY B. NEWHALL,

105 Chambers Street, New York Agent.

DAVID HYMES & CO.,

92 CHURCH STREET, NEW YORK,

MANUFACTURERS' AGENTS.

Bargains in Hardware & Cutlery.

Low estimates made on all kinds of **SMALL CASTINGS,** in the **Rough, Japanned** or **Varnished.**

NATIONAL Horse Nail Co.

MANUFACTURERS OF

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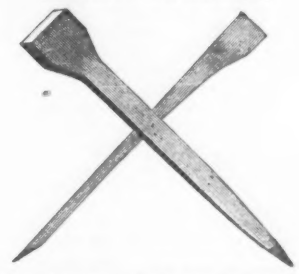

These nails are made of the best brands of **NORWAY IRON,** and are guaranteed to be equal to any in the market.

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A. E. DEITZ,

(Successor to Barnes & Deitz,)

Manufacturer of

Store Door Locks, Night Latches, Padlocks, Drawer Locks, &c., with Flat Steel Keys.

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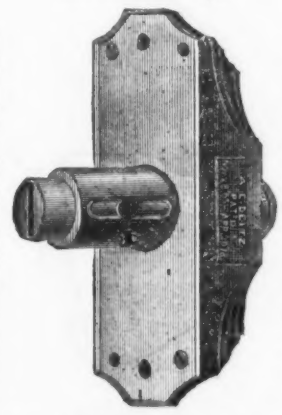

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Durrie & McCarty, Agents,

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WALKER'S

Forged Horse Shoes,

SHOENBERGER'S

Patent Toe Calks,

Superior to any in market.

Send for prices and samples.

A. BUSSING, General Agent,

4 Warren St., New York.

Peckham's "NEW IDEA"

3 lb. Mica Package for 1880.

PRICE REDUCED.

Put up expressly for Retail Dealers who desire to buy small quantities and a variety of desirable and saleable sizes. Put up in a neat and attractive Show case.

TWELVE SIZES OF MICA,

Of the very best quality.

¼ lb. 3x6	¼ lb. 2½x4½	¼ lb. 4½x6
¼ lb. 4x5	¼ lb. 2½x5½	¼ lb. 3 x5
¼ lb. 4x7	¼ lb. 3 x6	¼ lb. 2½x4
¼ lb. 2¾x5	¼ lb. 5 x8	¼ lb. 2½x3½

PRICE, **$8.00.** Net cash. No discount.

This Package sent FREE by express or mail to any part of the United States.

J. S. & M. PECKHAM, Utica, N. Y.,

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Patent "Self-Adjusting" Railroad Track Scales pronounced "the most accurate and durable" over all competitors at World's Fair, 1876. In use by Pennsylvania, Lehigh Valley, Baltimore and Ohio, and other Railroads. Patent Coal and Hay Scales. Warehouse and Platform Scales and Scales for all purposes. Machines for testing materials, all sizes.
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Manufacturers of L. Coes'

GENUINE IMPROVED AND MECHANICS'

Wide Bar Full Length.

Wide Bar Full Length.

Patent Screw Wrenches

UNDER PATENTS DATED

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MARCH 23, 1869,
REISSUED 1870.

NOVEMBER 10, 1863,
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REISSUED JUNE 1, 1869,
IMPROVED AUG. 1, 1877.

The back thrust when in use borne by the SHANK instead of the Handle.

None genuine unless stamped "L. COES & CO."

WORCESTER, MASS.

Warehouse, 97 Chambers St., & 81 Reade St., N. Y.

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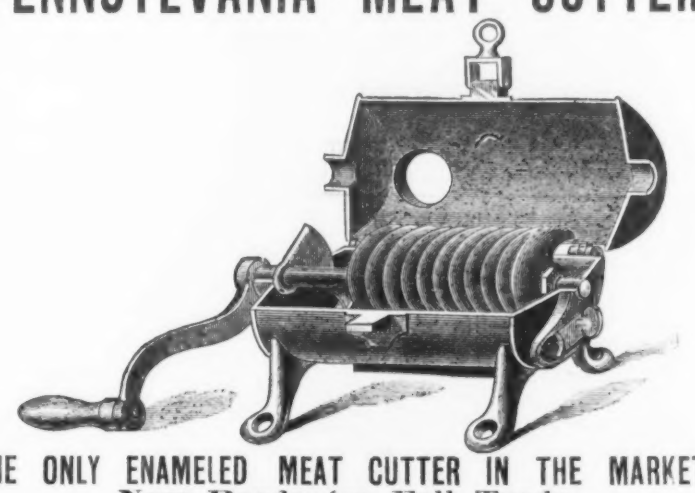
PENNSYLVANIA MEAT CUTTER.



THE ONLY ENAMELED MEAT CUTTER IN THE MARKET.

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PRICE LIST.

No. 1,	containing 8 Steel Knives, per dozen	$24.00
No. 2,	" 11 " " " "	28.00
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Discount to the trade, 50 per cent For sale by

LLOYD, SUPPLEE & WALTON, Philadelphia.

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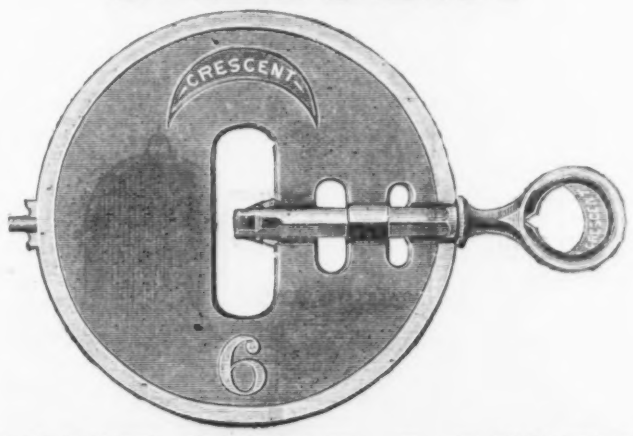


STOVE PIPE DAMPER.

PATENT APPLIED FOR.

THE BEST THING OF ITS KIND IN THE MARKET. CONSTRUCTED ON AN ENTIRELY NEW PRINCIPLE, EMBODYING SIMPLICITY, EFFICIENCY AND NEATNESS.

No Small Pieces to Lose, No Spring to get Out of Order, No Nut to Work off.

This Damper consists of but TWO pieces—the STEM and BLADE—the parts being so constructed that when the former is inserted (either side up) it engages within a notch near its end and a raised catch formed on the blade, which effectually prevents the stem from working out while in practical use, and at the same time admits of its withdrawal by the application of a little extra pressure outward. The Damper is held in any desired position by the pressure brought to bear on the pipe between the shoulder of the handle and the ends opposite and around the pivot formed on the blade.

Owing to its simple construction, no directions for attaching are necessary.

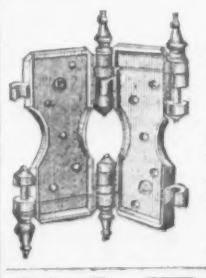
THE CLARK MFG. CO., Sole Manufacturers,

BUFFALO, N. Y.

FOR SCREEN DOORS,

Try the new combination,

LATEST AND BEST.



GEER'S SPRING BUTTS WITH OUR NEW BLANK BUTT.

The most effective of all Butts in the market, on a principle the reverse of all others, exerting their greatest power when the door is closed.

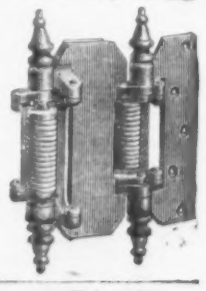
REDUCTION IN PRICE.

Per set, Single Action, for doors 1 inch thick.....75c
Per set, Double " " " " $1.50

Also, **Spring and Blank Butts** for all sized doors. For further information send for circular.

Manufactured by

THE COWLES HARDWARE CO., Unionville, Conn., U. S. A.



SABIN MFG. CO.,

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SABIN'S LEVER DOOR SPRINGS, For heavy doors.

BOSS AND CROWN SPRINGS, For light doors.

Send for Catalogue. Represented in New York by *DAVID HYMES & CO., 92 Church St.*

GEORGE W. BRUCE.

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Maynard's Planters', Yankee, Hilling and Bog Hoes, also Brades', Elwell's and others.
An unrivalled assortment.

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Wholesale Manufacturer of

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Hydraulic Rams.

There are few more interesting hydraulic machines than the ram, and few that are more generally neglected. They might be used in a great many cases where pumps are commonly employed, and would save much labor and time. They are, however, too commonly employed in places where they cannot work to advantage, and hence, in some sections a prejudice has been created against them, and they are lightly esteemed by a great many persons.

The history of the ram is very interesting, because the earliest forms have been so frequently innovated and claimed as novelties. The first notice we find of an arrangement for utilizing the momentum of a column of water for raising a portion of itself to a higher level, is in a letter written by Mr. John Whitehurst, and published in the "Philosophical Transactions" (English) for 1775. The letter describes an apparatus of which Fig. 1 is an illustration. It consists, essentially, of a reservoir of water A, from which a fall pipe B is carried to the air vessel H. A short pipe E, terminating in a cock F, branches from the main pipe before it reaches the air vessel H; between this branch and the air vessel a small clack valve G is placed in a suitable enlargement of the pipe. A second pipe, or rising main I connects the air vessel with a tank K, placed at a higher level than A.

The action is as follows: The cock F being opened, water from the tank A flows down the drive pipe B with a velocity varying with the fall. When a sufficient velocity has been attained, the cock F is closed by an attendant, and the column of water, in accordance with a well-known natural law, continues its course. Having no other outlet, it forces its way through a small valve into the air vessel H, compressing the air contained therein until brought to rest by its reaction. The elasticity of the air in the chamber H, in return, forces the water up the rising main I into the tank K.

By alternately opening and closing the cock F, a continuous flow of water into the tank may be maintained. The air in the vessel H acts as an elastic spring, and converts the intermittent flow of water to the vessel into a steady stream from it. Without this arrangement, the whole column of water in the rising main would necessarily be put into motion and stopped at each pulsation of the water in the delivery pipe. This, with a short-rising main, would produce heavy jars, and, in a longer one, the water could not be put in motion in this intermittent manner.

In 1773 Mr. Whitehurst erected one of his machines for supplying a brew house at the seat of Mr. Philip Egerton, at Oulton, in Cheshire, England. In this instance the fall pipe was 1½ inches in diameter and 200 yards in length. The cock E was fixed in the kitchen, 18 or 20 feet below the surface of water in the reservoir A. This cock being regularly used for drawing water for domestic purposes, and in almost constant action, it kept up a sufficient supply to the brew house. The ram, as left by Whitehurst, although very ingenious, was very limited in its application, requiring, as it did, human aid to work the cock or escape valve.

This early form of ram has, within a few years, been reinvented in the city of New York, and attention called to it as a valuable novelty for raising water to upper floors without the necessity of pumping, and without wasting the Croton water.

In a hospital in Bristol, England, long after Mr. Whitehurst had made his invention, a plumber was employed to carry the water from a cistern on one of the upper floors to the kitchen below. It happened that the lower end of the pipe, which was probably light and weak, as all the old-fashioned lead pipes were, burst almost every time the cock was used. Various attempts were made to remedy the evil, but with little success. It was at last determined to try the effect of soldering a small pipe on just behind the cock and carry the end of it up to the level of the water in the cistern. On shutting the cock it was found that the pipe no longer burst, but a jet of water issued from the upper end of the small pipe each time the cock below was closed. To prevent the escape of this water the pipe was carried higher until it reached the top of the hospital, twice the hight of the cistern, yet still there was a considerable escape of water from it. A cistern was then placed to receive it, and water was thus distributed to the highest floors without labor. Here a ram was constructed by force of circumstances, yet the workmen were unaware that such a machine had been previously devised.

Mr. Whitehurst did not follow up his invention, and, though he introduced the air chamber and made it capable of working practically, he did not attempt to make it work automatically. The invention was ahead of its day. Although it had most of the features of the hydraulic ram of the present day, Whitehurst cannot be said to be the inventor of the modern machine of that name.

In 1796 the celebrated Montgolfier, a French paper maker, who with his brother had in 1782 invented balloons, invented the hydraulic ram in its modern form. This was not only an entirely independent invention, but a complete novelty. The self-acting escape or impulse valve rendered the machine complete and entirely automatic. In some of the earliest forms this valve was a ball. Fig. 2 is reprinted from one of the earliest forms found in the patent specifications. The action will be easily understood. The water flows through the fall pipe C until it acquires sufficient momentum to lift the counterweight E and close the valve B; when this takes place the water, having no other outlet, forces its way through the valve A into the air chamber J, and thence passes into the rising main D. The water in pipe C is soon brought to rest by the reaction of the compressed air contained in the air vessel, and the valve A then falls. At the moment the delivery valve closes there is a slight recoil or regurgitation in the drive pipe, which, together with the counterweight E, causes the pulse valve again to open. The action now commences afresh.

Montgolfier's patent includes various modifications of the ram. In one case a syphon fall pipe is used in order to pass over any obstacle in its course, instead of cutting through it; in another instance two rams are designed to work with one fall pipe, in situations where a current of water passes alternately in opposite directions, as in a tidal river. One ram is placed at each end of the pipe and works alternately, according to the current. A third arrangement is for drainage purposes, where a stream flows at a higher level than that from which the water is to be removed. In this case the pulse valve is placed at the inlet end of the fall pipe. When it closes the momentum of the water in the fall pipe carries it forward, leaving a partial vacuum behind it, which is filled by the water from the lower level passing through a suitable pipe and clack. This clack prevents any return of water, which thus passes out of the fall pipe with the rest of the liquid. After the registration of the patent, Montgolfier appears to have further improved the ram by the introduction of spindle valves with verticle lift, both for the escape and delivery, instead of a ball valve or a clack. By placing additional weights upon the counterweight E it was possible to make any necessary adjustment.

Efforts have been made by some authors to claim for James Watt the honor of inventing the automatic escape valve for the hydraulic ram. The claim is based on the fact that he, with his partner, Mr. Boulton, took out a patent in England for such a valve in 1797. This was, however, by permission of the Montgolfiers, who were to all intents and purposes his English assignors.

Montgolfier's designs so completely covered the principle that his machines were thoroughly efficient, and were so perfect in action that most of the rams made at the present day have no advantages over his best designs.

Experience proved that the air in the air vessel was gradually absorbed by the water passing through it, and the working of the ram interfered with, in a greater or less degree, according to the hight of lift and length of delivery pipe. The younger Montgolfier arranged a small valve so as to keep the vessel supplied with air.

Figs. 3 and 5 represent cross and longitudinal sections of a Montgolfier ram, with the air cushions and air admission valves. The interesting points about this ram are the air cushions in the annular space I I, Fig. 3; the means of maintaining a constant supply of air in the air vessel, and the number of discharge valves used. In his patents, Montgolfier speaks of the air cushion as though it had been used before, but claims it in connection with the air-supplying arrangements of one of larger size than had before been practicable. Its object is to reduce the shock occasioned by the sudden closing of the impulse valve.

The impulse valve C, shown on a larger scale in Fig. 4, works in guides G G. D is a similar valve, also working in guides, but opening outward. L and K are two valves, placed at each end of the air passage which leads from the annular space I I to the external air. Through this passage the air is free to pass in one direction. The action of these valves is as follows: When the water escapes through the passage H H, the valve c drops to the position shown by the dotted lines, and the valve D is raised, but the valve K is closed. When, by the motion of the water, the valve C shuts, as in any other ram, the delivery into the air vessel takes place. A recoil then takes place, which is intensified by the air cushions contained in I I. This recoil of the water is sufficient to cause a partial vacuum in the air spaces. The valve K then opens, but the force of the air entering causes the valve L to close before too great a quantity has gained admission. All the air admitted, over and above what is needed to fill the space I, rises and lodges under the delivery valves, as it is forced out into the air vessel at the next stroke.

The inventor provided ample means for the delivery of water to be raised, by means of no less than seven delivery clack valves. This point is too frequently neglected in modern built rams, to their very great injury. A ram arranged in the manner we have illustrated is said to have been erected in France, at St. Elloe.

The next, Fig. 6, shows an arrangement which is described in the same patent as the last, but which is intended to raise a stream of pure water by means of one which is foul or unfit for the desired object. The ram proper is, in its working, exactly similar to that just described. In starting, the pipe Q I is supposed to be provided with water in the way shown in the drawing. At the moment the escape or impulse valve C closes, water from the pipe B rushes up the curved pipe P, compressing the air within it, reacts upon the surface Q, and forces the pure water S through the delivery valves E into the air chamber F. The water having expended its energy recoils with great violence, being assisted by the expansion of the air at P. This recoil produces a partial expansion of the air in the bent portion of the pipe P, and as the entrance of the air at H is prevented by the valve D, the pressure of the atmosphere on the surface of the pure water in the well W forces a portion of it through the foot valve into the rising pipe M. The water then recommences its flow and the action is repeated.

In these last figures B represents the body of the ram, as it was once called, or drive pipe. A is the mouth which was commonly made flaring, as shown. A, seen in Fig. 4, is the rising pipe. This form of ram is comparatively well known at the present day. Forty or fifty years ago it was described in an English magazine as a great novelty.

(To be continued.)

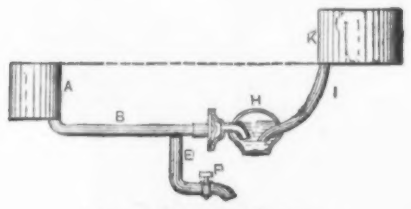


Fig. 1.—Whitehurst's Ram.

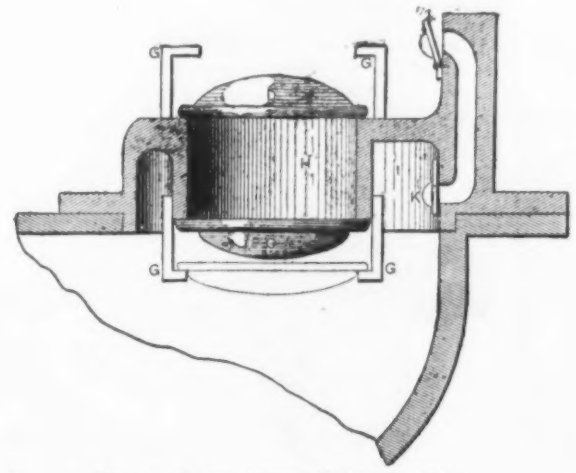


Fig. 4.—Enlarged View of Impulse Valve.

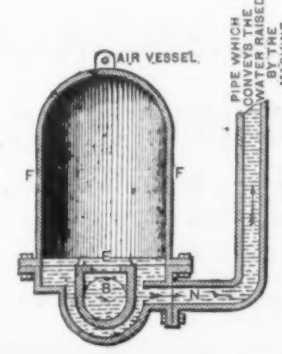


Fig. 5.—Cross Section of a Montgolfier Ram.

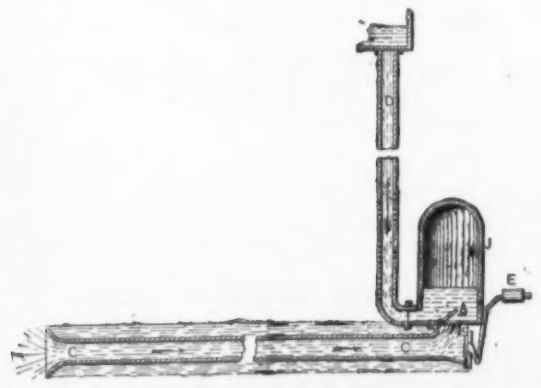


Fig. 2.—Montgolfier's Self-Acting Hydraulic Ram.

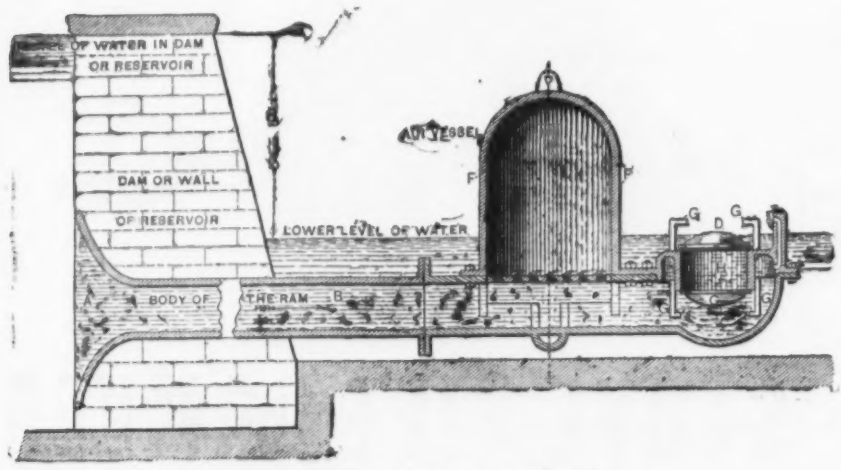


Fig. 3.—Longitudinal Section of Montgolfier's Ram.

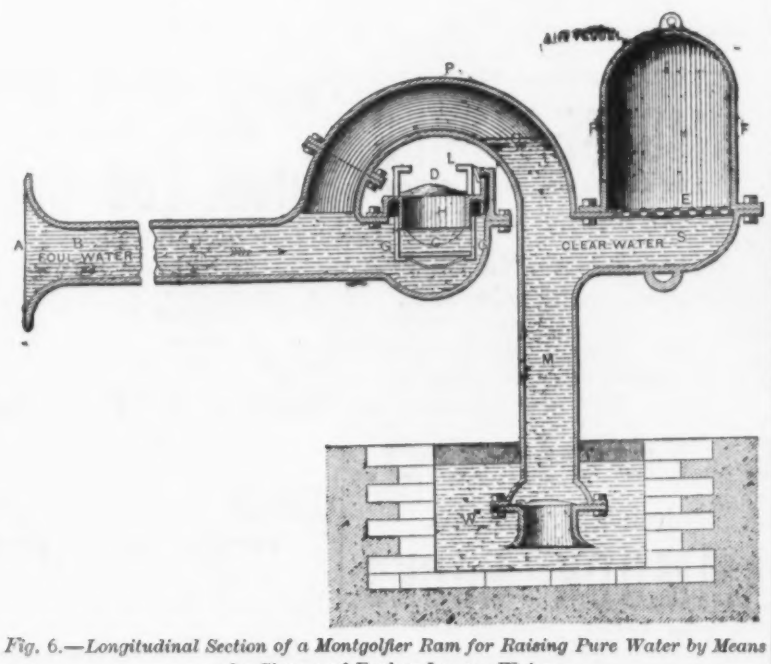


Fig. 6.—Longitudinal Section of a Montgolfier Ram for Raising Pure Water by Means of a Stream of Foul or Impure Water.

HYDRAULIC RAMS.

The Manufacture of Illuminating Gas in New York.

Mr. E. G. Love presented before the American Association a paper entitled "The Illuminating Gas of New York City," the main data of which are embodied in the following abstract:

No city on the globe can offer so many different processes for study as New York and its immediate vicinity. With a genuine coal gas, a coal gas enriched with naphtha, a wood gas enriched with naphtha, a water gas made on the Tessié du Motay plan, a gas made by the Lowe process, and so on, one can study almost any phase of the gas industry. There are ten companies in New York, and all, with one exception, furnish illuminating gas to the city at the present time.

The Mutual Company manufacture the body of their gas from wood, enriching with petroleum naphtha. This company previously manufactured a coal gas and enriched it with naphtha; but in September, 1879, they began making part of the gas from wood—still continuing the coal gas, however, to some extent. The results obtained proved so satisfactory that the proportion of wood gas has been increased, until now it is double that of the coal gas. As soon as suitable arrangements can be made the coal gas will be discontinued. A French engineer, Le Bon, first proposed the use of wood for obtaining illuminating gas about the close of the last century. In countries where wood is abundant and coal scarce this process is still employed to some extent, but it has generally been abandoned on account of the large percentage of carbonic acid produced. The Mutual Company make use of the charcoal to decompose the tar and convert the carbonic acid to some extent into the oxide. The wood used is Virginia pine, for which the company pay $5.22, corded in their sheds. From September, 1879, to August 1, 1880, they distilled 2125 cords, yielding 100,010,800 cubic feet of gas, or about 47,000 cubic feet per cord. Each charge consists of 80 pounds, and, as a cord weighs 3300 pounds, of 4 feet 4 inches wood, there are about forty-one charges in a cord. The company have eleven gas holders, with a total capacity of 2,500,000 cubic feet. The illuminating power for the first six months of this year averaged 26.53 candles. The specific gravity is greater than that of any other illuminating gas in the city, being .703 to .808. In 1879 the sulphur averaged 7.28 grains and the ammonia .82 grains for 100 cubic feet.

The Municipal and New York companies are manufacturing what is known as water gas. Previous to May, 1880, the New York Company were engaged in the manufacture of coal gas, but becoming convinced that water gas was the gas of the future, they bought of the Municipal Company the right to manufacture according to their process. The process employed by these companies is that of Tessié du Motay. The Municipal Company have two holders for crude water gas with a capacity of 250,000 feet. They are building a holder for the illuminating gas to hold 2,000,000 cubic feet. This, with the holders now in use, will give for illuminating gas a storage capacity of 3,500,000 feet. The commercial gas of the Municipal and New York companies contains about five grains of sulphur per 100 cubic feet, and is free from ammonia as a rule. The specific gravity varies from .637 to .664. The average illuminating power of the Municipal gas for the first six months of the present year was 29.68 candles. Just now it is somewhat lower. The average illuminating power of the New York gas for the months of May and June last was 24.35 candles. The following are the analyses of the gases of the various companies of New York:

	Manhattan Co., coal gas.	Harlem Co., coal gas.	New York Co., water gas.	Municipal Co., water gas.	N. Y. Mutual Co., wood & naphtha gas.	Metropolitan Co., coal & naphtha gas.
Hydrogen	46.46	46.53	29.41	28 76	28.87	38.41
Marsh gas	45.17	42.38	30.20	31.87	22.95	42.66
Carbonic oxide	1.19	3.14	19.82	20.83	27.19	9.17
Illuminants	6.77	6.31	14.52	15.60	15.45	7.41
Nitrogen	0.41	0.50	2.49	2.94	3.24	5.35
Carbonic acid	.....	1.08	3.38	.....	2.15	.....
Oxygen	.....	0.06	0.18	.....	0.15	.....
Sulphuret'd hydrogen	.....	trace	.....	.....	trace	.....
Total	100.00	100.00	100.00	100.00	100.00	100.00

Mr. Love's paper was concluded with some interesting statistics of gas in New York. The number of public lamps in the city on June 30, 1880, was 23,394; the miles of gas mains in the city on December 31, 1879, were 860; there were used in the public buildings in 1879, 13,737,860 cubic feet of gas, costing $26,122.45; the cost of lighting the public lamps in 1879 was $420,677.73; there are 92,848 meters in use; 3,660,214,900 feet of gas were made in 1879, and 654,818 tons of coal were carbonized.

The Iron Age Directory

and Index to Advertisements.

DE-OXYDIZED BRONZE CO.

DE-OXYDIZED BRONZE

(PATENTED)

IS AN ALLOY OF LAKE COPPER AND BEST ASIATIC TIN,

IN ANY PROPORTION REQUIRED, SO AS TO BE

Either as DUCTILE AS COPPER, as TOUGH AS IRON, or as HARD AS STEEL,

According to the Proportion of Copper and Tin Used.

The PROCESS of making the alloy is what constitutes its superiority over any other known alloy of copper and tin or any other bronze composition.

The castings made from this metal, owing to its perfect fluidity when melted, possess great density, perfect soundness and homogeneity. Unlike certain bronze and other compositions, IT can BE HANDLED WITHOUT THE LEAST DIFFICULTY BY ANY ORDINARY FOUNDER, as it flows like oil in pouring.

Thus the necessity and trouble of shipping patterns, the delay in receiving castings and the expense of the double charges of freight or express, such as attend the obtaining, in many cases, of Phosphor Bronze, are entirely avoided by ordering D. O. B., IN INGOTS.

Where this metal has superseded other compositions of similar character, it has ENDURED THREE TIMES AS LONG. In a word, we claim that DE-OXYDIZED BRONZE not only has none of the objectionable features attributed to similar compositions, but that it possesses all their good qualities, in addition to its own merits and the advantages peculiar to itself.

Such as the following summary will make clear:

1st.—Its Great Convenience in Handling as compared with Phosphor Bronze.

2d.—We claim for it Superior Anti-Friction Qualities to any other known Brass or Bronze.

3d.—Great Malleability and Tenacity.

4th.—Its homogeneousness and smoothness of surface render it Capable of the Highest Polish.

5th.—As before mentioned, we claim for it Unequalled Endurance.

6th.—We claim that Journals Made of D. O. B. require ONE-FOURTH LESS LUBRICATING MATERIAL than any other composition yet known.

Finally, this metal has never failed to give more than satisfaction wherever used. To sustain our statements, the following testimonials will suffice:

Henry Disston & Sons, Saw, Tool, Steel and File Works, Front and Laurel Streets.

Philadelphia Smelting Company, City: PHILADELPHIA, October 4th, 1879.

GENTLEMEN—After a trial of eighteen months of your "DE-OXYDIZED BRONZE" as Journal Boxes in our Rolling Mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used. Very truly, HENRY DISSTON & SONS.

Office of Eagle Iron Works, 1162 North Third Street.

Philadelphia Smelting Company: PHILADELPHIA, August 29th, 1879.

GENTLEMEN:—In reply to yours of the 28th inst., we beg to say that we have been using your "DE-OXYDIZED BRONZE" for over a year, and have found it better than any composition boxes we have used, and as long as you continue to make it the same quality, we shall use no other metal in our Engine Boxes. We therefore take pleasure in recommending it to Engine Builders in general.

Yours respectfully, HOFF, FONTAINE & ABBOTT.

This Metal is used for the following purposes, and we can refer to large concerns in addition to the above through the New England and Middle and Western States, who are using it in preference to any other:

1st. ENGINE, CAR and MACHINERY JOURNALS.
2d. PUMPS, VALVES and LININGS, CYLINDERS, PINIONS, COGS, PLUNGERS, CRANK PINS, &c.
3d. CAR TRIMMINGS, HARNESS and COACH FURNITURE, HOUSE HARDWARE, STEAM FITTINGS, &c.
4th. WIRE, SHEETS, RODS and TUBES.

And for any other purpose that a HANDSOME, DURABLE and SOUND BRONZE is required.

We especially commend it to RAILROAD COMPANIES, CAR BUILDERS, MACHINISTS, ENGINEERS and others requiring a JOURNAL METAL that will stand the SEVEREST FRICTION and the HEAVIEST PRESSURE.

MANUFACTURED AND FOR SALE IN INGOTS AND CASTINGS BY THE

PHILADELPHIA SMELTING COMPANY,

S. E. Corner Twelfth and Noble Streets,

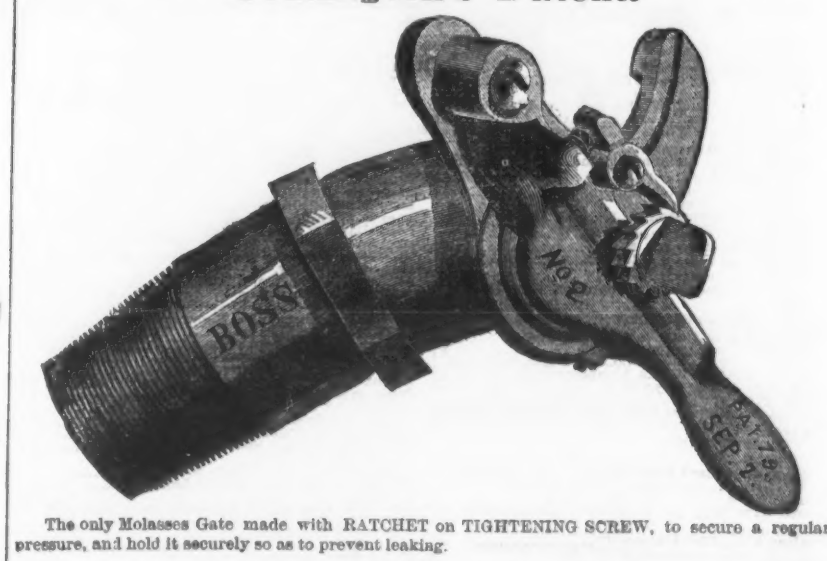
PHILADELPHIA, PA., U. S. A.,

Where all orders will receive prompt attention.

OUR GENUINE BABBITT, guaranteed at a speed of 10,000 per minute, and under any pressure, and all grades of ANTI-FRICTION METALS always on hand.

BOSS MOLASSES GATE.

Coddington's Patent.



The only Molasses Gate made with RATCHET on TIGHTENING SCREW, to secure a regular pressure, and hold it securely so as to prevent leaking.

ALSO,

KIMBALL'S SOLID CAST-STEEL SHOVELS & SPADES,

Lockwood's Solid Cast-Steel Hoes,

Norris' Patent Frame Pulleys.

Send for Price List.

KIMBALL SHOVEL CO., Sole Manufacturers,

Office, 67 German Street, - BALTIMORE, MD., U. S. A.

PETER GERLACH & CO.,

MANUFACTURERS OF

Superior Cast Steel Saws

OF ALL DESCRIPTIONS.

Ice Tools, Butchers' Meat Rockers and the Standard Steel Flue Scrapers.

ALSO, MANUFACTURERS OF

STRAIGHT AND BILGING CYLINDER STAVE SAWING MACHINERY,

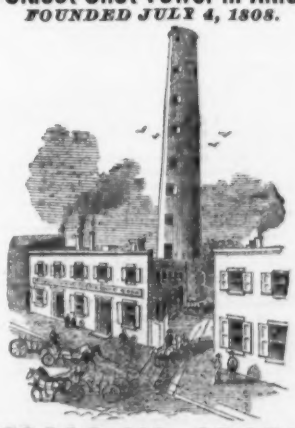
For all kinds of

Pail, Tub, Keg, Half Barrel, Barrel, Shook and Pipe Staves.

51 Centre Street, - - - CLEVELAND, OHIO.

The Oldest Shot Tower in America.

FOUNDED JULY 4, 1808.



THOMAS W. SPARKS,

Manufacturer of

SPARKS'

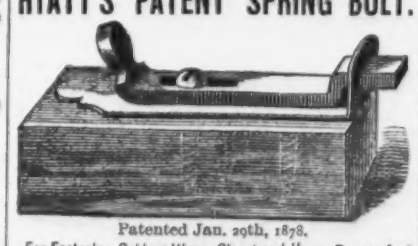
American Chilled Shot,

Rivaling the English and all Others.

STANDARD DROP & BUCK SHOT AND BAR LEAD.

121 Walnut Street, Philadelphia.

HYATT'S PATENT SPRING BOLT.



Patented Jan. 29th, 1878.

For Fastening Cabinet Ware, Closet and House Doors, &c.

We call the attention of the trade to these Wrought Brass and Iron Bolts, as being the best and cheapest in the market. Sizes, two inches and upward, both plain and neck bolts. Two screws fasten the bolt and bed-plate to the wood; no others are required; the bed-plates are made of brass, from which the spring is cut and raised, upon which the bolt slides with an easy, elastic movement, saving expense of screws and producing a strong, handsome and cheap Bolt. Price list furnished on application.

BRASS GOODS MFG. CO.,

43 Chambers St., New York.

We also manufacture all kinds of Brass and Tin Goods, Drop Bases, Thimbles and Roses for Door Knobs, Plate Escutcheons, Brass Labels, Patent Mirror Business Cards, &c.

A. WYCKOFF,

Manufacturer of

Wyckoff Patent Wood Water Pipe,

Steam Pipe Casing,

Chain Pump Tube, Curbs, Reels, Rubber Valves, Chain, &c.

Established 1866. Send for pamphlet.

ELMIRA, N. Y.

S. CHENEY & SON.

Manlius, N. Y.,

Small Gray Iron Castings.

We warrant our work for smoothness and finish.

The Iron-Masters'

LABORATORY.

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.

With Branch at Warrenton, Virginia,

J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore	$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do	12.50
For each additional constituent of usual occurrence	1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel	7.00
For each additional constituent of usual occurrence	6.00
For the per cent. of Carbonate of Lime, and insoluble Silicious Matter in a Limestone..	10.00
or each additional constituent	2.00
or the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal.	12.50

For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.

For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application

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Grant Fan Mill & Cradle Co.

Manufacturers of

Grant's Grain, Coffee, Rice, Cochineal and Pimento Fans,

and

TURKEY WING GRAIN CRADLES, 4, 5 and 6 fingers.

GRAPE VINE GRAIN CRADLES. 4 fingers.

SOUTHERN PATTERN GRAIN CRADLES, 4, 5 and 6 fingers.

All of a superior quality. None genuine unless marked *Grant Fan Mill and Cradle Co.* Send for illustrated catalogue and price list.

P. O. Address, MELROSE, Rensselaer Co. N. Y.

EMPIRE FORGES.

Improved, Without Belts, Bellows, Crank Pins, Dead Centers or Back Motion. Send for circular.

Empire Portable Forge Co.,

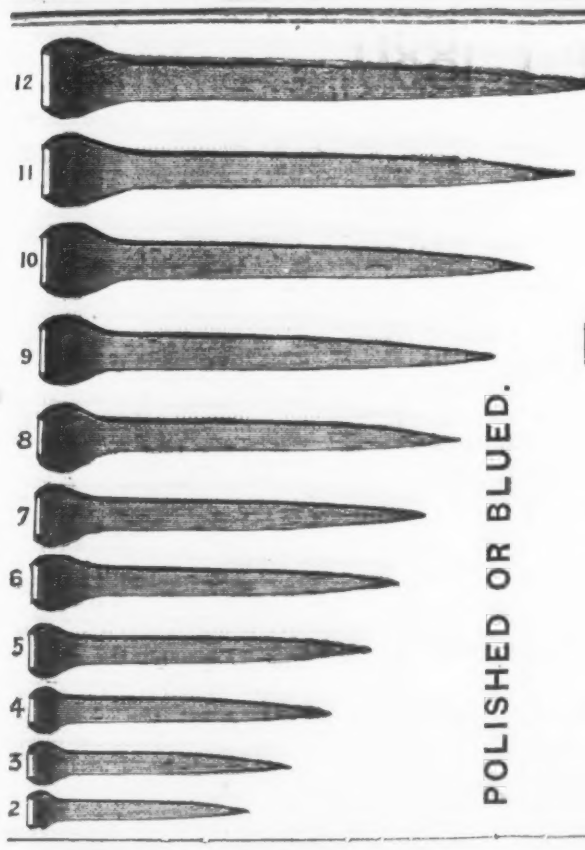
Cohoes, N. Y.

JAMES COMLY,

4739 Paul St., Frankford, Philadelphia, Pa.,

Manufacturer of

Hardware Novelties, Glass Cutters, &c.



AUSABLE HORSE NAILS, Twisted, Bent and Drawn COLD.

Hot Forged and Cold Hammered Pointed.

Are the **only Nails in market** that are made in imitation of the **Hand Process.** They have **the uniformity of Machine** Nails and the **toughness** of those hammered by hand. Our

HOT FORGED AND COLD HAMMERED POINTED NAILS

Are the Standard Nails,

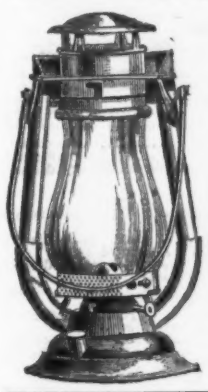
and are **acknowledged to be the best in the market.** They are used by the **best shoers** in **New York, Brooklyn, Philadelphia, Chicago, Saint Louis, Milwaukee, Baltimore,** &c., and

GENERALLY THROUGHOUT THE UNITED STATES.

They also compete successfully in Foreign Countries with machine and hand-made Nails of their own manufacture.

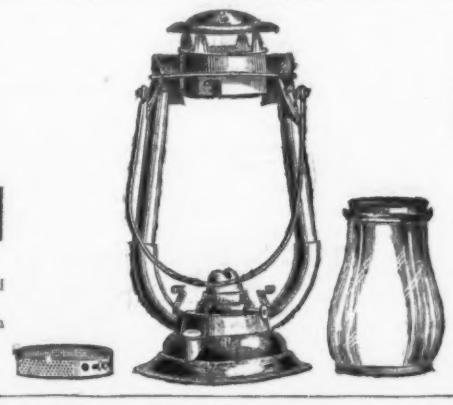
AUSABLE HORSE NAIL CO.,

4 Warren St., New York.



MILLER'S NO. 13 LANTERN

Gives more light and will hold the flame more perfectly than any other Lantern made.



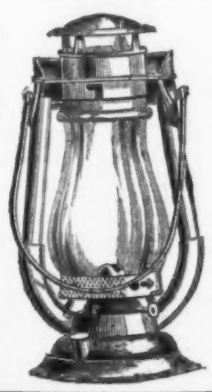
For Prices and Samples, address

Edw'd Miller & Co.,

Meriden, Conn.,

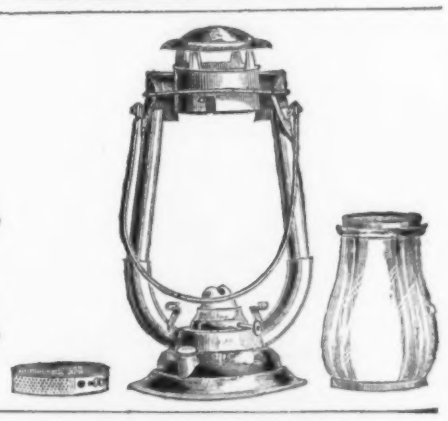
OR

35 Warren St., New York.



Manufacturers of

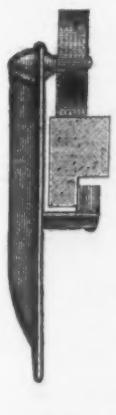
Lanterns,
Brass Kettles,
Machine Oilers,
Kerosene Goods,
Tinners' Trimmings,
&c., &c.



LIST OF BRANDS

Old,
Reliable,
Indian Pond,
(Red End),
Premium,
Union,
White Mountain,
Letoile,
Diamond Grit,
Fisherman (Rough),
Boss Hacker (Oval),
Lamoille,
Willoughby Lake,
Green Mountain,
Black Diamond,
Ragg (9 and 10 inch),
Mowing Machine,
Paper Mill Stone,
Vermont Darby,
Chocolate,
Axbitts,

WRITE ME FOR PRICES.



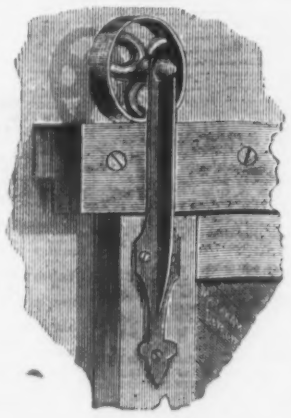
End View of Track.

Made of two pieces.

All Wood Track.

Patented April 30, 1878.

Reissued July 8, 1879.



THE KIDDER SLIDE DOOR HANGER CO.

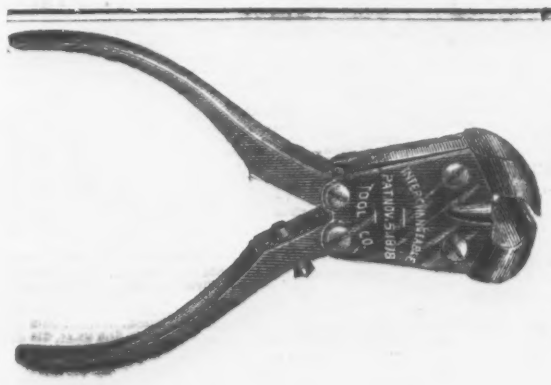
ROMEO, MICH.,

SOLE MANUFACTURERS OF THE

"KIDDER" BARN DOOR HANGER.

No Iron Rail, and cannot be thrown off the Track, Least Noise, Easiest Running,

And the cheapest Hanger to the user made. For sale by the wholesale trade generally.
Also sole agents for *MORTON'S NEW REVERSIBLE CHECK AND PUMP VALVE,* two valves in one. Every valve warranted. Will outwear five common valves. Sixty days' trial given, and if not satisfactory, no sale. Send for circulars.



HALL'S PATENT
DOUBLE COMPOUND LEVER CUTTING NIPPERS.

NEAT, HANDY, POWERFUL AND DURABLE.

Every pair warranted to cut steel wire.
Extra parts supplied to replace those damaged by wear or accident at a trifling cost.
Can be adjusted by any one in a few seconds.
Made entirely of steel, drop forged.

Send for Price List,

Manufactured by

THE INTERCHANGEABLE TOOL COMPANY, of New York.

Manufacturers of Special Tools and Machines on the Interchangeable System.

All orders should be addressed to *THE INTERCHANGEABLE TOOL CO., Milford, Conn.*

General Agent, A. CUSTAM, 32 Howard St., New York.

New York Wholesale Prices, September 1, 1880.

HARDWARE.

Anvils.
Eagle Anvils American....₩ ℔ 10c dis 20 %
Wright's....10¾c @ 11c
Armitage's Mouse Hole....9½ @ 9¾c
Trenton....10½c

Anvil, Vise and Drill.
Millers Falls Co., $28.00....dis 20 %

Augers and Bits.
Conn. Valley Mfg. Co. }
Douglass Mf. Co. }
Humphreysville Mfg. Co }
Ives }
Beecher (French, Swift & Co) } dis 40 % from list of Jan 7, 1880.
Griswold }
Nobles Mfg. Co. }
Kasson's Patent }
Cook's, Douglass Mfg. Co....dis 40&10 %
Snell Mfg. Co's C. S. Augers....dis 40 %
" B. Machine....dis 40 %
" C. S. Bits....dis 40 %
" Jennings' Bits....dis 35 %
Patent Solid Head....dis 30 %
Lewis' Patent Single Twist....dis 33⅓
Russell Jennings' Auger Dowel, Machine-Dowel and Hand-Rail Bits....dis 10&10&10 %
Russell Jennings' Augers....dis 16⅔&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers dis 25&10&10&10 %
Imitation Jenning's Bits....dis 40@45 %
Ives' "Jennings" Bits....dis 33⅓&10 %
Andrews Bits....dis 40 %
Expansive Bits, Clark's, small, $18; l'ge, $26....dis 25 %
" Ives....$20 @ $30—dis 33⅓ %
" Blake's....$20—dis 40 %
" Parmelee's....$20 and $30 .dis 33⅓ %
Hollow Augers Ives' / French Swift & Co } dis 15 %
" Douglas....dis 15 %
" Bonney's Adjust., ₩ doz $48—dis 25&10&10 %
" Stearns' Adjust., ₩ doz $48—dis 20&10 %
" Ives' Expansive ...each $4.50—dis 30 %
" Univ'sal Expansive, each $4.50—dis 20 %
Woods....dis 25 %
Gimlet Bits....$7.50 ₩ gross, dis 45 %
" Diamond....₩ doz $1.10 dis 20&10 %
" "Bee"....dis 35&5 %
Double Cut Gimlet Bits Shepardson's....dis 40 %
" " Ct. Valley Mfg. Co...dis 30&10 %
" " Hartwell's....dis 60&10 %
" " Douglass'....dis 40 %
" " Ives'....dis 50 %
Morse's Bit Stock Drill....dis 25 %
L'Hommedieu's Ship Augers....dis 15 %
Watrous Ship Augers....dis 15 %
" Extension Lip....dis 30 %

Awl Hafts.
Sewing Brass Ferrule....$3.50 ₩ gross—dis 40&10 %
Peg " ....3.50 " dis 40&10 %
Patent Sewing, Short....$1.00 ₩ doz—dis 40&10 %
" " Long....$1.40 ₩ doz—dis 10 %
Patent Peg Plain Top....$10.00 ₩ gross—dis 40&10 %
" " Leather Top....12.00 " dis 40&10 %

Awls, Brad Sets, &c.
Awls Sewing, Common....₩ gross $1.70—dis 25&10 %
" Shouldered Peg....₩ gross 2.45—dis 25&10 %
" Patent Peg....₩ gross .63—dis 25&10 %
" Shouldered Brad....₩ gross $2.70—dis 25&10 %
" Handled Brad....$7.00 ₩ gross—dis 20&10 %
" Handled Scratch....$7.00 ₩ gross—dis 20&10 %
Socket Scratch....$1.00@$1.25 ₩ doz—net
Brad Sets, Aiken's....₩ doz $12.00—dis 45&10 %
No. 42, $10.50; No. 43, $12.50....dis 60&10 %
Stanley's Excelsior, No. 1, $9.60...dis 20&10 %
" " No. 2, 4.80...dis 20&10 %
" " No. 3, 7.80...dis 20&10 %

Axes.
Single Bit, 4½ to 5½ and under....₩ doz $11.00 net
" 4½ to 6 and over....₩ doz $11.50 net
" Beveled....50 c ₩ doz advance
Double Bit, 4½ to 5½ and under....₩ doz $22.00 net
" 4½ to 6 and over....₩ doz $23.00 net
" Beveled....$1.00 ₩ doz advance

Axle Grease.—Fraser's....₩ ℔ 6c

Bag Holders.
Sprengle's Patent, per doz. $18....dis 40 %

Balances.
All Spring Balances....dis 15&10 %

Bells.
Hand, Light Brass....dis. 60&10 %
" Extra Heavy....dis 45 %
" White Metal....dis 60 %
" Silver Chime....dis 20&10 %
Globe (Cone's Patent)....dis 25&10 %
Gong, Abbe's....dis 45&10 %
" Yankee....dis 30&10 %
" Barton's....dis 30&10 %
Crank Taylor's....dis 25&10 %
" Brook's....dis 50&10&2 %
" Cone's....dis 10 %
" Connel's....dis 35 %
Lever, Sargent's....dis 60&10 %
" Taylor's Bronze or Plated Lever....net
" Japanned Lever....dis 25&10 %
" R. & E. M. Co.'s....dis 50&10&2 %
Pull, Brook's....dis 50&10&2 %
" Western....dis 25&10 %
Call....dis 25 %
Cow, Common Wrought....dis 40&10&10 %
" Western....dis 20&10 %
" Sargent's new list....dis 40&10&10 %
" Kentucky "Star"....dis 20&10 %
" Sargent's new list....dis 40&10&10 %
" Dodge's Genuine Kentucky, new list—

Nos.	0	1	1½	2	3	4	5	6	Hog	
	$12.00	10.00	9.00	8.00	6.00	5.00	3.50	2.50	5.00	dis 50 %

Texas....dis 30&10

Bellows.
Blacksmiths', Common....dis 45 %
" Extra and Pittsburgh Pattern....dis 20 %
Moulders....dis 25 %
Hand Bellows....List of Dec. 1, 1879, net

Belting, Rubber.
N. Y. Belting and Packing Co....new list net

Bit Holders.
Extension, Barber's....₩ doz $15.00—dis 40&5 %
" Ives'....₩ doz $15.00—dis 40 %
Diagonal....₩ doz $24.00—dis 40 %
Angular....₩ doz $24.00—dis 40 %

Blind Adjusters.—Domestic....₩ doz $3.00, dis 15 %

Blind Fasteners.—Mackrell's....dis 30 %
Van Sand's....No. 2000, per gross, $10.00...dis 15 %
" old pattern....₩ gross, $9.00 net
Washburn's Patent....₩ gross $10.50 net
Merriman's....new list ne
Mackrell's....₩ doz. pairs, $0.65, dis. 10 %

Blind Staples.
Barbed, ⅞ in. and larger....₩ ℔ 12c net
" ¾ in....₩ ℔ 16c net

Blocks.
Differential Pulley Blocks....dis 20 %
Penfield Block Works, Rope and Iron Strap'd..dis 40 %
Wrot. Iron Com. bushed.dis 25 %
all steel roll'r.dis 10 %
Sheaves dis 35 %
Stanley R. & L. Co., Rope and Iron Strap'd..dis 40&10 %

Bolts
Cast Iron Barrel, Shutter, &c....dis 50&10 %
Cast Iron Chain, Sargent's list)....dis 60&10&10 %
Bush's Lever and Chain Bolts....dis 40 %
Ives' Pat. Door Bolts....dis 40 %
Wrought Barrel....dis 55&10 %
" Square....dis 55&10 %
" Shutter, all Iron, Stanley's list....dis 50&10 %
" " Brass Knob, " "....dis 20&10 %
" " Sargent's list....dis 55&10 %
" Sunk Flush, Sargent's....dis 66⅔&10 %
" " Stanley's....dis 40&7½ %
" B.K.Flush, Com'n, Stanley's....dis 50&6 %
" " Ex. Heavy. "....dis 40&10 %
" Plated Knob & Slide Flush....dis 50&2½ %
Carriage and Tire, Common....dis 75&10 %
" " Philadelphia, new list....dis 55 %
" " Philada. Pattern....dis 60&10 %
" Shelton's....(old list) dis 60&10 %
R. B. & W. Carriage (old list)....dis 65 %
Tire, Am. Screw Co.'s Phila, new list, Nov 1, '79, dis 60 %
" "Bay State"....dis 80 %
" R. B. & W., new list....dis 60 %
Stove—American Screw Co.'s....dis 37½ %
" R. B. & W....dis 37½ %
Plow....dis 40 %
" R. B. & W....dis 40 %
Machine, List of July 15, '79....dis 45&50 %
Bolt Ends "....dis 45&50 %

Borax....11½@12½c ₩ ℔ net

Boring Machines. Upright. Angular.
First quality no Augers....$5.50 $6.75 ...dis 40 %
Phillips' with Augers....6.50 7.00 net

Braces.
Q. S. Backus....dis 60 %
Wilson Mfg. Co....dis 10 %
Barber's....dis 40&5 %
Spofford's Patent....dis 50&10 %
Noble's Patent....dis 40&5 %
Ives' Patent Braces....dis 50&10 %
Common Ball (American)....dis 30&10 %
Amidon's....dis 50 %
Barker's Impd....dis 40 %
Empire....dis 30 %
Buffalo Ball....dis 40 %

Brackets.—Shelf (Sargent's)....dis 60&10 %

Bright Wire Goods list of Dec, 15, 1879, dis 60&10 %

Bull Rings.—Union Nut Co....dis 50&20 %
Sargent's....dis 60&10 %
Hotchkiss'....low list dis 35 %
Humason Beckley & Co.'s....dis 60&10 %

Butts.
Wrought Brass....dis 45 %
Cast Brass, Tiebout's....dis 30 %
" Corbin's....dis 40&10 %
Fast Joint, Narrow....dis 40&10 %
" Broad....dis 40&10 %
Loose Joint....dis 50&10 %
" Japanned....dis 50&10 %
" with Acorns....dis 55&10 %
Parliament Butts....dis 45&10 %
Mayer Hinges....dis 45&10 %
Loose Pin no Acorn....dis 50&10 %
" Acorns....dis 50&10 %
" Japanned....dis 50&10 %
" Plated Tips....dis 50&10 %

WROUGHT IRON.
Fast Joint Narrow....dis 40&10 %
Lt. Narrow....dis 40&10 %
Broad....dis 40&10 %
Loose Joint, Broad....dis 50&10 %
Table Butts, Back Flaps, &c....dis 40&10 %
Inside Blind, Regular....dis 25&10 %
" Light....dis 40&10 %
Loose Pin, Wrt....dis 50&10 %

Spring Hinges:
American Spiral Spring Butt Co., Jap'd....dis 25 %
" " " Fancy....dis 20 %
Gem Spiral Spring Butts, Japanned....dis 25 %
" " " Ornamental....dis 20 %
Geer's Spring and Blank Butts....dis 25 %
Sabin Mfg. Co.'s Double Acting....dis 35 %
Union Spiral Spring, Japanned....dis 25 %
" " Ornamental....dis 20 %
Union Spring Hinge Co.'s....dis 25 %
American Spring Hinge Co.'s....dis 25 %
Union Mfg. Co....dis 25 %
Bommer's....dis 25 %
Blind Butts, Parker....dis 60&10&10 %
" Palmer....dis 35&10 %
" Seymour....dis 60&10 %
" Shepard's "Double Locking" Nos. 1 & 2....dis 60&10&10 %
Shepard's "Noiseless," Nos. 50 & 60....dis 60&10&10 %
" Lull & Porter....dis 60&10 %
" Nicholson....dis 45&10 %
" Huffer....dis 45 %
" Clark's, Nos. 1, 3, 5....dis 60&10&10 %
" Sargent's No. 12....dis 70&10 %

Bow Pins.
Hotchkiss'....low list net
Humason, Beckley & Co.'s....dis 60 %
Sargent & Co's....$19.70 and $21.40, dis 60&10 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co....dis 20 %
Bradley's....dis 25 %
Beatty's....dis 25&5 %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

Can Openers.
Messenger's Comet....₩ doz $3.00, dis 25 %
American....₩ doz $2.00, dis 70 %
Duplex....₩ doz 25c, dis 15@20 %
Lyman's....₩ doz $3.75, dis 20 %
No. 4, French....₩ doz $2.25, dis 50 %
No. 5, Iron Handle....₩ gross $7.50 net
Eureka....₩ doz $2.50, dis 10 %
Sardine Scissors....₩ doz $7.00, dis 55 %
Star....₩ doz $5.00, dis 10 %
Sprague....dis 50 %

Caps—Percussion, ₩ 1000.
U. M. C., F. C. trimmed....50c } dis
" F. L. ground....70c } 10&5 %
U. M. C. Cen. fire ground....70c } dis
" Double W. proof....$1.40 } 10&5 %
G. D. & S. B....36c, dis 7½ %
Double Waterproof, in 1-10's....$1.40 } dis
Colt's Pistol, "....70c } 10&5 %
F. L....50c } dis 10&
E. B. 1-10, Trimmed....65c } 5 %
E. B. 1-10 Ground Edge....70c }
Musket, in 1-10's....65c net

Cartridges.—Metallic....dis 60 %

Cards.—Horse and Curry....dis 10 %
Cotton....dis 10 %
Wool....dis 10 %

Car Pusher.—"Giant"....$6.25 each, dis 20 %

Carpet Stretchers.
Cast Steel, Polished....₩ doz $5.00, dis 30 %
" Iron Steel Points....₩ doz $2.00, dis 35 %
Bullard's....dis 25 %

Casters.
Bed....new list July, '80, dis 25&10 %
Plate and Shallow Socket " " dis 25&10 %
Deep Socket " " dis 25&10 %

Cattle Leaders.
Humason, Beckley & Co.'s....dis 65&10 %
Sargent's....dis 65&10 %

Chain.
Trace, 6½-1-2-2....₩ pair 79c }
" 6½-10-3....₩ pair 70c } dis
" 7-10-2....₩ pair 86c }
German Halter Chain, New list Oct. 22, '79....dis 40 %
" Coil, New list Oct. 22, '79....dis 40 %
Covert Halter, Hitching and Breast....dis 35 %
Oneida Halter Chain....dis 30 %
Galvanized Pump Chain....₩ ℔ 10c net
Jack Chain, Iron....dis 45 %
" Brass....dis 40 %

Chalk.
White....₩ gross 60c net
Red....₩ gross 80c net
Blue....₩ gross 100c net
White Crayons....₩ gross 150 net

Chisels.
Socket Framing, Crossman....dis 65&5 %
" Buck Bros....new list, dis 22½ %
" Merrill....dis 65&10 %
" Witherby Tool Co....dis 65&10 %
" Douglass'....dis 65&10 %
" Firmers, Crossman....dis 65&5 %
" Buck Bros....new list, dis 22½ %
" Merrill....dis 65&10 %
" Witherby Tool Co....dis 65&10 %
" Douglass'....dis 65&10 %
" Corner....dis 65&10 %
Tanged Firmers extra....dis 33⅓@40 %
" Butcher's....$5.00 @ $5.25 to £
" Spear & Jackson's....5.00 to £
" Buck Bros (Shank)....5.25 0 %

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron....dis 25 %
Adjustable, Gray's....dis 20 %
" Lambert's....dis 20 %
" Snow's....dis 40&5 %
" Hammer's....dis 15 %
" Stearns'....dis 15&10 %
Cabinet, Sargent's....dis 65&10 %
Carriage Makers', Sargent's....dis 65&10 %
Cord and Tape (T. & S. Mfg. Co.)....dis 30 %

Clips, Axle.
Norway or Best....dis 40&5 %
Superior....dis 40&5 %

Coal Hods.
Griffiths....dis 33⅓ %

Cockeyes....1¼ in., 28c.; 1⅜ in., 33c.; 1¾ in., 47c, net

Cocks, Brass.
Racking....new list, July 10, '80 }
Globe " " }
Plain Bibbs " " } ....dis 40 %
Ale and Beer " " }

Coffee Mills.
Board and Box....new list, Jan., 1880, dis 35 %
Increase Wilson's....net
Selsor's Pat....$9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.)....dis 20 %
French Steel....dis 20
The Swift (Lane Bros.)....dis 0

Combined Dinner Pail and Lantern.
Per doz $14.00....dis 30 %

Compasses, Dividers, &c.
Compasses....dis 45 %
Callipers....dis 45 %
Dividers....dis 45 %
Bemis & Call Co.'s Dividers....dis 60&5 %
" " Compasses & Callipers....dis 50&5 %
" " Wing & Inside or Outside.dis 50&5 %
" " Double....dis 60 %
" " Call's Pat. Inside....dis 30 %
Cook's....dis 25 %
Excelsior....dis 50 %
Miller's Patent....dis 25 %

Coopers' Tools.
Bradley's....dis 15 @ 20 %

Corkscrews.—Humason & B....dis 33⅓ %
Clough's Wire....dis 25 %

Corn Knives and Cutters.—Bradley's..dis 10 %
Wadsworth's....dis 33⅓ %

Crow Bars.
Cast Steel....₩ ℔ 8¼c
Iron, Steel Points....₩ ℔ 6¼c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1.80 2.00, 2.40....dis 10 %
Curling Tongs....₩ doz $3.65, dis 10 %
Pinching Irons....₩ doz 7.50, dis 20 %

Curry Combs.
Fitch's (List of No. 240, $1)....dis 40 %
Hotchkiss' Novelty....new list, July, 1880, dis 25 %
" Exclr. Supr. Champion....dis 25 %
Lawrence....new list, July 1880 dis 25 %
Lawrence, with detachable Mane Comb new list July 1880, dis 25 %
Rubber....₩ doz $10.00, dis 15 %

Curtain Pins.—Silvered Glass....net
White Enamel....ne

Cutlery.
Meriden Cutlery Co. (Table)....net
Am. Miller Bro.'s Cutlery Co....dis 25 %
Humason & Beckley, Pocket....dis 33⅓ %
The Wm. Rogers Mfg. Co....net
Naugatuck Cutlery Co....list net
Aaron Burkinshaw's Pocket....dis 25 %

Dog Collars.
Embossed Gilt....dis 20 %
Leather....dis 30 %
Brass....dis 25 %

Door Springs.
Torrey's Rod....₩ doz $2.10, dis 10 %
Gray's "....₩ doz $1.70, net
Bee Rod....₩ doz $1.70, net
Gem (Coil)—
No. 1, Large, Japanned....₩ doz $3.50 }
No. 2, Medium, ...₩ doz 2.50 } list net
No. 3, Small. ....₩ doz 2.00 }
Challenge (Coil)— Nos. 9 7 6
Japanned....₩ doz $2.00 2.50 3.50 }
Coppered....₩ doz 4.00 4.50 5.00 } is 10 %
Galvanized....₩ doz 3.50 4.00 4.50 }
Nickeled....₩ doz 5.50 6.00 7.00 }
Star (Coil)—For Cop'd, Nickel-Plated, &c. see list.
No. 4, ("Snoo Fly") Screen door size ₩ doz $1.80 }
No. 5, Screen Door Size....₩ doz $2.00 } dis 20 %
No. 6, Medium....₩ doz 2.50 }
No. 7, Large....₩ doz 3.50 }
Sabin's Lever..No. 1, $1; 2, $1.50; 3, $2; 4, $2.50; dis 30 %
Sabin's Boss....No. 1, $5.40; 2, $4.20; 3, $3.00, dis 50 %
Sabin's Crown....₩ doz $2.75, dis 50 %
Philadelphia....5 in., $5.00; 8 in., $7.00, dis 35 %
Barker's Concealed....dis 20 %
Cowell's....No. 1, $18.00; No. 2, $15.00 ₩ doz, dis 50 %
Rubber, complete....₩ doz $1.80, net

Drawing Knives.
Crossman's No. 1....dis 65&5 %
Merrill....dis 65&10 %
Nobles Mfg. Co....dis 15 %
Bradley's....dis 35 %
Adjustable Handle....dis 20 %
Witherby Tool Co....dis 65&10 %
Douglass....dis 65&10 %

Drills and Drill Stocks.
Blacksmiths'....each $2.70 net
Blacksmiths Self Feeding....each $7.50, dis 20 %
Breast P. S & W....dis 20 %
" Hotchkiss....dis 20 %
Breast, Wilson's....dis 20 %
" Miller's Falls....each $3.00, dis 25 %
Bartholomew's....each, $2.50 dis 25&10 %
Ratchet, Merrill's....dis 10 %
" Ingersoll's....dis 25 %
" Whitney's....dis 20 %
" Weston's....dis 20 %
Moore's Triple Action....dis 20 @ 25 %
Whitney's Hand Drill....dis 50 %
Wilson's Drill Stocks....dis 10 %
Automatic Boring Tools....each $2.25, dis 20 %

Drill Chucks.—Morse's Beach Patent....dis 30 %
" Adjust..each $10.00, dis 30 %
Danbury....$8.00, dis 30 %

Egg Beaters.
Dover....₩ doz. $2.50 net
National....₩ doz $4.50, dis 33⅓ %
Family....per gross $33; per doz., $3.00 net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved) ₩ 100 $15.00 @ $54.00, net
Mill E. Buckets, heavy, 5 to 10 inches (Duc's Improved) ₩ doz $5.60 @ $10.20 net
Storehouse, (Duc's Patent) 12 to 17, $12.00 @ $20.00...net

Emery and Emery Paper.
Genuine Chester—Regular Nos....₩ ℔
" " Flour and FF....₩ ℔
" " in 10-lb. cans....2c extra
Washington Mills—Regular Nos....₩ ℔ 8c
" Flour....₩ ℔ 5c
Wellington Mills, Grain....₩ ℔ 10c net
" " Flour....₩ ℔ 8c net
Hampden Emery Grain....5c net
" Flour....3c net
B. & A. Emery Paper....dis 20@25 %

Enameled and Tinned Ware.
Kettles....45 %
Sauce Pans....dis 30 %
Tinned Sauce Pans....dis 30 %

Escutcheon Pins.
Iron....dis 20 %
Brass....dis 40 %

Escutcheons.
Door Lock....Same discounts as Door Locks
Brass Thread....dis 55 %
Wood....dis 25 %

Faucets.
Fenn's....dis 40 %
Fenn's Cork Stops....dis 33⅓ %
Star....dis 55&10 %
Frary's Patent Petroleum....dis 20&10 %
Wood and Metallic....dis [illegible]
West's Patent Key....dis 45 %
Metallic Key, Leather Lined....dis 40 %
Cork Lined....dis 70 %
Enterprise (Self Measuring)....₩ doz, $36.00, dis 20 %

Felloe Plates....₩ ℔ 100, dis 5 %

Files.
Auburn....$5.00 to £, dis 35 %
Arcade....$5.00 to £, dis 20 %
Black Diamond, new list....dis 30 %
E. M. Boynton's....new list, dis 25 %
Nicholson....(Nicholson List) dis 30 %
Madden & Cockayne File Co....dis 20 %
Heller & Bros new list)....dis 15 %
Hiscox File Mfg. Co., new list....dis 20 %
J. & Riley Carr....4.50 to £
Johnson & Bro....dis 20 %
Butcher's....4.50 to £
Walter Spencer & Co.'s "Diamond"....4.50 to £
Fisher's....4.75 to £
Moss & Gamble....4.50 to £
H. Disston & Sons (new list)....dis 30 %
Western (new list)....dis 20 %
Limet & Co. (French)....$4.25 to £

Fluting Machines.
Knox, 4-inch Rolls....$3.25 each }
" 6 " "....4.00 " } dis 10 %
" 8 " "....6.50 " }
Peerless, 4-inch Rolls....4.00 each net
" 5 " "....4.75 each net
Eagle, 3½-inch Roll....$2.15, dis 10 %
" 5½ " "....$2.85, dis 10 %
Eureka, No. 1, 7-inch Roll....6.00 each, dis 10 %
" No. 2 5-inch Roll....4.00 each, dis 10 %
Crown. 4½-in. $3.50: 6-in. $4.00: 8-in. $6.50 each dis 10 %
Star....4½ in.. $4.00; 6 in., $5.00 each dis 10
Crown Jewel....6 in., $3.40 each. dis 10 %
American, 5 in., $3; 6 in., $3.40; 7 in., $4.50 each, dis 10 %
Domestic Fluter....1.50 each net
Geneva Hand Fluter, No. 1....₩ doz $15, dis 20 %
Crown Hand Fluter, Nos. 1, $15.00; 2, $12.50; 3, $10.00 ₩ doz....dis 10 %
Shepard Hand Fluter....No. 75 ₩ doz $15, dis 10 %
" " " No. 90, $9.00; No. 110, $7.25;
" " " No. 100, $6.00 ₩ doz....net
Clark's Hand Fluter....₩ doz $15.00, dis 20 %
Combined Fluter and Sad Iron....₩ doz 15.00, dis 30 %
Buffalo....₩ doz 10.00, dis 10 %

Fluting Scissors....dis 45 %

Forks.
Hay, Manure and Spading....dis 40&5 %
Plated" A 1, Rogers & Bro....dis 33⅓&5 %
" Reed & Barton....dis 33⅓&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co....dis 20 %
American....dis 20 %

Fry Pans.
Burnished, list as follows....dis 55 %

No.	0	1	2	3	4	5	6	7	8
₩ doz.	$3.00	$3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

Gauges.
Marking, Stanley's....dis 45&10 %
" Chapin's....dis 50&10 %
Wire....dis 10 %
" Smith's Patent....₩ doz 18.00, dis 40 %

Gimlets.
Nail and Spike....dis 45 %
"Bee" Gimlets....₩ gross $12.00 dis 60&10 %
"Eureka" Gimlets....dis 60 %
"Diamond" Gimlets....dis 40 %
Double Cut Shepardson's....dis 40 %
" " Hartwell's....dis 50 %
" " Ives'....dis 50 %
" " Douglass'....dis 40 %

Glue Pots.
Tinned and Enameled....dis 30 %
Family, Howe's "Eureka"....dis 40 %
" L. F. & C.'s "Handy"....dis 25 %

Grindstone Fixtures.
Sargent's Patent....dis 65&10 %
Reading Hardware Co., new list....dis 25&10 %
" " "Keystone"....dis 25&10 %

Gun Wads.
U. M. C. B. E. 11 up....$2.00 }
" " 9 & 10....2.30 }
" " 7 & 8....2.00 } dis 5&5 %
" P. E. 11 up....3.10 }
" " 9 & 11....4.00 }
" " 7 & 8....4.[illegible] }

Halters.
Covert's Pat. Rope....dis 50 %
Horse and Cattle Ties, Covert's....dis 50 %

Hammers.
Maydole's....dis 15 %
Cheney's....dis 25 %
B. Hammonds (new list July 10, '80)....dis 20 %
Humason & Beckley....dis 50 %
Verree....dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 and 1.75, dis 20&10 %
Warner & Noble's....dis 10 %
Kip's (old list)....dis 20 %
Yerkes & Plumb....dis 15 %

Hand Cuffs and Leg Irons.
Providence Tool Co.'s Hand Cuffs, $15.00 ₩ doz } dis 10 %
" " Leg Irons, $25 ₩ doz }
Tower's....dis 25 %

Handles.—Door or Thumb Latches—

Nos.	0	1	2	3	4	
Per doz.	$0.80	1.00	1.18	1.35	1.50	dis 55@60 %

Roggin's Latches....per doz 40c@45c net
Bronzed Iron Drop Latches....₩ doz $0.90 @ 1.15 net
Jap'd Store Door Handles—Nuts, $2.00; Plate $1.35 no Plate, $1.08....net
Barn Door....per doz $1.88, dis 10 %
Wrought Chest....dis 55&10 %
Surface Chest, Sargent's list....dis 62½&10 %
Flush Chest....dis 45&10 %
Lifting....dis 50&10 %
Saw and Plane....dis 40&10 %
Boynton's Pat. Loop Saw Handles....dis 25 %
" " Centennial Saw Handles....dis 25 %
Hammer and Hatchet....dis 20 %
Brad Awl....₩ gross $3.00, dis 20&10 %
Hickory Firmer Chisel, assorted, ₩ gross $4.50 }
" " " large, " 5.00 }
Apple " " assorted, " 5.00 }
" " " large, " 6.00 }
Socket " " assorted, " 3.00 } dis 20&10 %
" Framing " assorted, " 5.00 }
File, assorted, ₩ gross....2.75 }
Auger, assorted, ₩ gross....6.00 }
" large,....7.00 }
Patent Auger, Ives'....dis 25
" Douglass'....₩ set $1.25, net
" Swan's....₩ set $1, net

Hangers.
Barn Door....dis 55&10 %
Novelty....dis 40 %
Challenge....dis 50 %
Climax (Anti-Friction)....dis 40 %
Sterling Improved (Anti-Friction)....dis 60&10 %
Cheritree....dis 50 %
Kidder's....dis 40 %

Harness Snaps.
Henshaw's....List of 1½ changed to 14 00, dis 50 %
Judd's....." " " 14.00, dis 50 %
Fitch's (Bristol) " " " 14.00, dis 50 %
Great Western....dis 50 %
Hotchkiss'....dis 10 %
Andrews'....dis 50 %
Sargent's....dis 60&10 %
"German....dis 60&5 %
Covert....dis 40 %

Hatchets.
Isaiah Blood....dis 15 %
Shingling, Nos. 1 2 3....₩ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3....₩ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3....₩ doz 7.50 8.00 8.50
Hunt's....dis 15&5 %
Shingling, Nos. 1 2 3....₩ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3....₩ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3....₩ doz 7.50 8.25 8.50
Hurd's....dis 33⅓
Shingling, Nos. 1 2 3....₩ doz $8.00 $8.50 $9.00
Claw, Nos. 1 2 3....₩ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3....₩ doz 8.00 8.50 9.00
Yerkes & Plumb....dis 15 %
Shingling, Nos. 1 2 3....₩ doz $7.50 $8.00 $8.50
Claw, Nos. 1 2 3....₩ doz 8.25 8.75 9.25
Lathing Nos....₩ doz 7.50 8.00 8.50
Simmons's....dis 20
Shingling, Nos. 0 1 2 3....₩ doz $7.50 $8.00 $8.50 $9.00
Claw, Nos. 1 2 3....₩ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3....₩ doz 8.00 8.50 9.00
Broad, Nos. 1 2 3 4....₩ doz 9.00 10.00 12.00 14.00
" Nos. 5 6 7 8....₩ doz 16.00 18.00 20.00 22.00
Collins....dis 10 %
Shingling, Nos. 1 2 3....₩ doz $6.00 $6.50 $7.00
Claw Nos. 1 2 3....₩ doz 6.50 7.00 7.50
Lathing, Nos. 1 2 3....₩ doz 6.00 6.50 7.00

Hay Knives.
"Lightning"....₩ doz $20.00 net
Wadsworth's....dis 33⅓

Hinges.
Gate, Western....₩ doz $10.00, dis 60 %
" N. E....₩ doz $10.13, dis 60 %
" N. E. Reversible....₩ doz $6.50, dis 60
Gate, Clark's No. 1....₩ doz $0.00, dis 50 %
" N. Y. State....₩ doz $0.10, dis 50&10 %
" Automatic....₩ doz $12.50 dis 40 %
" Common Sense....dis 10 %
" Seymour's....dis 40&10 %
" Shepard's....Nos. 10, 20 & 25, dis 50 %
Rolled Blind Hinges....dis 60&10 %
Rolled Plate....dis 60&10 %
Rolled Raised....dis 60&10 %
Wrought Strap and T, list Dec. 20, '77....dis 45&10 %
Plate Hinges { 8, 10 & 12 in. $6.50 ₩ 100 ℔ } dis 10 %
"Providence" { over 12 in. $5.20 ₩ 100 ℔ }
Screw Hook and Strap { 8, 10, 12 in., $6.75 ₩ 100 ℔ } dis 10 %
{ 14 to 36 in., $5.50 ₩ 100 ℔ }
Heavy Welded Hook { 8 to 12 in., $0.75 ₩ 100 ℔ } dis 10 %
{ 14 in. & up, 4.50 ₩ 100 ℔ }
Screw Hook and Eye { ⅝ & 1 in., 90 / ¾ in. 90 / ⅞ in. 100 / ½ in. 120 } dis 20 %

Hoes.—Solid Shank, C. S....₩ doz $8.00, dis 0&5 %
Socket....₩ doz 9.00, dis 0&5 %
Grub....dis 15 %
Planters'....dis 35 %
Scovill Pattern....dis 33⅓ %
Scovill Pattern, Handled....dis 25 %
Hick's Pat. Solid C. S. Planters'....dis 20&10 @ 30 %
" " Scovill Pattern dis 20&5 @ 35 %
Winsted & Lane, Planters....dis 25 %
" " Scovill Pattern....dis 20@25 %

Hooks.
Bird Cage, Sargent's list....dis 60&10 %
Cotton....dis 50 %
Cotton, Patented (N. Y. Mallet & Handle Wks), dis 30
Cotton (Humason & Beckley Mfg. Co.)....dis 40 %
Belt, (new list Dec. 24, 1879.)....dis 60&10 %
Bench—Hotchkiss', $5.00 ₩ doz....net
" Weston's, No. 1, $10.00; No. 2, $9.00 ₩ doz dis 25 %
" McGill's, $3.00 ₩ doz....dis [illegible] %
" Skinner's, $6.25 per doz....dis 20 %
Clothes Line Sargent's list....dis 60&10 %
" " Reading list....dis 33⅓&10 %
Ceiling..} Sargent's list....dis 60&10 %
Harness, } Reading list....dis 20&10 %
Coat and Hat, Sargent's list....dis 60&10 %
" " Reading....dis 33⅓&10 %
" " T. & S. Mfg. Co's list....dis 25 %
Picture Hooks, Brown's Pat. Solid Brass, $4 per gross....dis 25 %
Tassel (T. & S. Mfg. Co.)....dis 40 %
Wrought Staples and Hooks and Staples....dis 65&10 %
" Staples, Stanley's list....dis 65&10 %
Wire Screw Hooks and Eyes, new list....dis 60&10 %
Grass and Bush....dis 40@45 %
Whiffletree—Patent....dis 45 %
Hooks and Eyes—Malleable Iron....dis 60&10 %
" Brass....dis 60&10 %

Horse Nails.

	Nos. 5	6	7	8	9	10	
Ausable....₩ ℔	30c	27c	24c	24c	23c	22c	dis
" Finished, Polished or Blued... "	31c	28c	26c	25c	24c	23c	20 %

A C.... 60 50 40 30 27 25 23 22 21 21 20 20c } dis
Nos.... 1 2 3 4 5 6 7 8 9 10 11 12 } 15 %

	Nos. 5	6	7	8	9	10	
H. P. Pointed and Finished	26	23	21	20	19	18	is 20 %
National, Pointed and Polished, Pat. Fin.	28	25	23	22	21	20c	%
Putnam Hammer, P't'd	29	26	24	23	22	21c	

Horse Shoes.—Burden....₩ keg $4.37½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy....₩ keg 4.37½
Mule Shoes....₩ keg 5.37½

Ice Awls, Chisels, &c.
American Ice Chisel....₩ doz. $3.50 net
National "....₩ doz $0.25 dis 20 %
Novelty Ice Breakers....₩ doz $6.25 dis 20 %
White's Sliding Head Picks....₩ doz $2.50 dis 40 %
Dunlap's Ring Picks....₩ doz $[illegible] dis 40&10 %
Wood Head Picks, Sargent's ₩ doz $1.85, dis 60&10&10 %
Iron " ₩ doz 1.85, dis 60&10&10 %
Ice Mallets Pick in Head....₩ doz 1.75 net
Pick in Handle....₩ doz 3.00 net
Ice Axes, Small, Cast or Malleable....₩ doz 1.20 net
Kitchen Ice Tongs....₩ doz 2.25 net
Combination Ice Tools....₩ doz $200 net

Kettles.
Brass, 7 to 13 inches inclusive....₩ ℔ 35c net
Brass larger than 13 inches....₩ ℔ 38c net
Enameled....dis 40 %

Knives.
Ames' Butcher Knives....dis 20 %
" Shoe....dis 15 %
" Bread....₩ doz $1.50, dis 15 %
Moran's Shoe and Bread Knives....dis 20 %
Hay and Straw—"Wadsworth's"....dis 33⅓ %
Table and Pocket....See Cutlery

Knobs.
Carriage (Jap'd 80c. ₩ gross)....dis 55 %
Base—Common....dis 30&10 %
Hemacite Door Knobs....New list, dis 35&5 %
Door, Mineral....}
" Por. Jap'd....} Same discounts as Door Locks.
" " Plated....}
" " Por....}
Furniture, Plain....750 gross inch, dis 10 %
" Wood Screws....dis 20 %

Picture (T. & S. Mfg. Co.)....dis 40 %
" Sargent's....dis 50&10 %
Hemacite Picture....dis 35 %
Shutter, Porcelain....dis 55 %

Ladles.
Melting—Sargent's....dis 50&10 %
" Reading....dis 20&10 %
" Monroe's Patent....₩ doz $4.00, dis 25 %

Lanterns.
Tubular....No. 0, $9.65; No. 1, $11.30 } net
With Guards 25c extra. }
Hurricane No. 2....₩ doz $5.75, net
Peerless....No 5, ₩ doz $11.75, dis 10&10 %
Brady's Patent....dis 10&10 %
Ætna....dis 10&10 %
Yankee....dis 10&10 %
De Beque....dis 10&10 %
Police....Small, $7.00; Med., $8.25; Large, $12.00, dis 10 %
Convex Reflector....$2.75 ₩ doz, dis 10 %

Lemon Squeezers.
Porcelain Lined....₩ doz $6.00—dis 30 %
Wood....₩ doz 3.00—dis 30 %
Eureka, Tinned....₩ doz $8.00, dis 10 %
Dunlap's Improved....₩ doz $4.00 net
Sammis'....No. 1, $7.00; No. 2, $12.00 ₩ doz., dis 45 %
Townsend's Patent....$6.00 ₩ doz., dis 33⅓ %

Lines.—Linen Fish....dis 25&10 %
Cotton Chalk....dis 55 %
Sil. Lake Chalk....Nos. 0, 1, 2, 3, $6.00, $6.50, $7.00, $7.50....dis 15&10 %
Mason's Linen....dis 25&10 %
Wire Clothes, Galvanized....each 30 @ 40c net

Locks and Latches.
Cabinet—Eagle....} Changes made in list price of
" Gaylord....} some numbers July 1, 1880,
" Bridgeport..} and also July 15, dis 10&2½
" A. E. Deitz....dis 30 %
Trunk....dis 10 %
Langstroth & Crane's List Jan. 1 '77.
Round Key, No. 1 to 5....dis 40&10 %
" No. 1½ to 12....dis 40&10 %
Flat Key....dis 33⅓&10 %
A. E. Deitz, Flat Key....dis 33⅓ %
Yale Lock Co., Flat Key....dis 40 %
"Shepardson" or "U. S."....dis 35 %
"Fetter" or "American"....dis 33⅓ %
Plate....dis 33⅓&2 %
F. Many's "Extension Cylinder"....$10.50 ₩ doz, net

DOOR LOCKS, &c
Branford....}
Norwalk....}
Norwich....}
P. & F. Corbin....} New list June 10, 1880.
Russell & Erwin....} dis 50&2 % cash
Mallory, Wheeler & Co....}
Reading Hardware Co....}
Trenton Lock Co....}
Padlocks—Russell & Erwin....} ....dis 45 %
" Mallory, Wheeler & Co....} and 2 % for cas
" Wm. Wilcox & Co....}
" Yale Lock Mfg. Co.'s "Standard"....dis 40 %
" Romer's....dis 30 %
" Conestoga....dis 60 %
" J. H. McWilliams....dis 10 %
" A. E. Dietz....dis 35 %

Mallets.—Hickory....dis 10&10 %
" Lignumvitæ....dis 10 %
Penfield Block Works, Lig., Apple & Hickory..dis 30 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 3 4
₩ doz..$14.00 17.00 19.00 30.00—dis 30 %
Miles' Challenge....Nos. 1 2 3
₩ doz..$22.00 30.00 40.00—dis 30 %
Perry's Nos. 1 2 3 4 4 g'rd 5 g'rd
Each....$3.00 4.00 5.00 11.00 13.00 36.00—dis 30 %
Woodruff's (P. S. & W.)....Nos. 100 150
₩ doz $15.00 18.00 dis 30 %
Hales'....Nos. 11 12 13
₩ doz..$27.00 33.00 45.00..dis 40&10&2 %
Draw Cut....Nos 5 2 0 8 10
Each..$50.00 75.00 80.00 225.00 400.00—dis 20 %
American....dis 25 %
Nos. 1 2 3 4 B 5
Each $5.00 7.00 10.00 25.00 50.00 60.00
Silver & Deming....dis 25 %
Pennsylvania....dis 50 %
Nos. 1 2 3 00
₩ doz $24.00 28.00 36.00 28.00
Beef Shavers (Enterprise Mfg. Co.)....dis [illegible] %

Mincing Knives.
Am., 1 blade, $12; 2 blades, $21; 3 blades, $30 per gross.
Lathrop's....dis 25 %
Smith's....per doz $1.75, dis 10 %
Cowles Hdw. Co....dis 40&10 %

Molasses Gates.
Stebbins Pattern....dis 50&10 %
" Genuine....dis 47½&10 %
" Tinned Ends....dis 40&10 %
Chase's Hard Metal....dis 60&10 %
Bush's....dis 20 %
Lincoln's Pattern....dis 50&10 %
Weed's....dis 15 %

Nails....See Trade Report

Nuts and Washers.
Square Nuts....5½@6c off list
Hexagon Nuts....5½@6c off list
Washers....5 @5½c off list

Nut Crackers
Table (Humason & Beckley Mfg. Co.)....dis 33⅓ %
Blake's Pattern....₩ doz $3.00, dis 10 %
Turner & Seymour Mfg. Co....dis 50 %

Oakum.
Best....₩ ℔ 11c
U. S. Navy....₩ ℔ 10c
Navy....₩ ℔ 8½c

Oilers.—Zinc and Tin....dis 45 %
Brass and Copper....dis 40 %
Olmsted's....dis 40 %
Broughton's....dis 40 %
Malleable (Hammer's)....₩ doz $5.00, dis 10 %
Prior's Patent or "Paragon," Zinc....dis 45 %
" " Brass....dis 40 %

Ox Balls....dis 40&10 %

Pencils.
Faber's Carpenters'....High list, dis 40&10 %
" Round Gilt....₩ gross $5.25 net
Dixon's Lead....₩ gross 4.50 net
" Lumber....₩ gross 6.75 net

Packing, Steam.
N. Y. Belting and Packing Co....new list net

Picture Nails.
Brass Head, Sargent's List....dis 50&10 %
" T. & S. Mfg. Co....dis 40 %
Porcelain Head, Sargent's List....dis 50&10 %
" " Judd's List....dis 30 %
Porcelain Head, T. & S. Mfg. Co....dis 30 %
Niles' Patent....dis 40 %

Pinking Irons....₩ doz 75c, ne

Plaiting Machines.
Magic....₩ doz $10.00, net
Astor Plaiting Machine....each $15.00, dis 20 %
Crown Plaiting Machines....dis 25 %
6in., $6.00. 10in., $10.00 each

Planes and Plane Irons.
Bench, First Quality....dis 25&10 %
" Second "....dis 30&10 %
Moulding....dis 25&10 %
Bailey's (Stanley R. & L. Co.) new list Jan. '79.dis 20&10 %
The Stanley (S. R. & L. Co.) " " dis 20&10 %
Bailey's "Victor" " dis 20&10 %
Defiance Adjustable....dis 20&10 %
Plane Irons, Butcher's....$5.50 to £
" Buck Bros....$5.00 to £
" Auburn Tool Co.'s....dis 5&10 %
" The Globe Mfg. Co. "Baldwin Iron"....dis 5&10 %
" Ohio Tool Co....dis 5&10 %
" Sandusky Tool Co....dis 5&10 %

Pliers and Nippers.
Button's Patent....dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers No. 2; 5 in., $20; No. 4, 7 in., $30 ₩ doz....dis 40 %
Humason & Beckley Mfg. Co....dis 33⅓ %
Gas Pliers....dis 50 %
Eureka Pliers and Nippers....dis 25 %
Russell's Parallel....dis 25 %
P. S. & W. Cast Steel....dis 35 %
" Tinners' Cutting Nippers....dis 15 %

Plumbs and Levels.
Disston's....dis 70 %
Stanley R. & L. Co.'s Pat. Adjustable....dis 60&10 %
" " " Non-Adjustable....dis 50&10 %
Chapin's Patent Adjustable....dis 60&10 %
" Non-Adjustable....dis 60&10 %
Standard Rule Co.'s New Adjustable....dis 60&10 %
" Non-Adjustable....dis 60&10 %
Johnson's Patent Adjustable....dis 60&10 %
Pocket Levels....dis 60&10 %
Davis' Inclinometers....dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger....per doz $37.50, dis 20 %
Fletcher Post Hole Augers....₩ doz 36.00, dis 20 %
Vaughan's Post Hole—
6 in. $23.60; 7, 8 and 9 in. $25 per doz....dis 15&10 %
Eureka Diggers ₩ doz. $40.00....dis 25&10 %

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw per doz $19.00, dis 20 %
" Pruning Hook....." 12.50, dis 20 %
E. S. Lee & Co.'s Pruner....dis 30 %
Pruning Shears....₩ doz $5.50@$6.00

Pulleys.
Hot House and Tackle....dis 70 %
Jap'd Screw....dis 70 %
Brass Screw....dis 55 %
Jap'd Side....dis 70 %
" Clothes Line....dis 70 %
Hay Fork Solid Eye, $4.50; Swivel, $5.00, dis 20&10&10 %
" " "Anti-Friction,"....$7.50 dis 20&10 %
" " "F" Common and Pat. Bushed....dis 20 %
" " Tarbox Pat. Iron....dis 20 %
Shade Rack....dis 60 %

Punches.
Belt or Drive....₩ doz $2.00; 2.25; 2.50, dis 45 %
Bemis & Call Co.'s Cast Steel Drive....dis 50&5 %
" " Springfield Socket....dis 50&5 %
Spring....₩ doz $7.00, dis 45 %
Leach's Patent....dis 25 %
Bemis & Call Co.'s Spring and Check....dis 40 %
Solid Tinners'....₩ doz $[illegible] dis 40 %

Rail.
Sliding Door Wrought Brass.....₩ D 42c dis 20 %
" " Iron, Painted .₩ foot 1 ½c. dis 60&10 %

Barn Door....	Inch.....	½	⅝	¾
	Per 100 feet.	$2.60	3.40	5.40—dis 10 %

" for N. E. Hangers—

	Small.	Med.	Large.
Per 100	$2.10	2.70	3.30—net

Razor Straps.
Genuine Emerson.....dis 40 %
Badger's Emerson.....dis 40
Badger's (not Emerson).....dis 25 %
Evans'.....dis 40 %
Imitation Emerson.....₩ doz $2.75, dis 40&10 %
Hunt's.....dis 40&5 %
Chapman.....dis 15 @ 20 %
Saundr's.....dis 10 %
Torrev's.....dis 20 %

Rivets.
Iron and Tinned.....dis 40 %
In bulk, list of May 21.....dis 20 %
Copper Rivets and Burs.....dis 45 %

Nos..	7	8	9	10	11	12	13	14	15
₩ D ..	49c	50c	52c	54c	56c	58c	60c	65c	70c

Tinned Iron Belt Rivets and Burs.....dis 20 %

Rivet Sets.........dis 40 %

Rods.
Stair.....New list, March 1 '79, 10%
" American Patent.....dis 20 %

Rollers.
Barn Door, Sargent's list.....dis 55&10 %
Novelty.....dis 10 %
Acme (Anti-Friction).....dis 40 %

Rope. Manufacturers' Net List, Aug. 4, 1880

Manila.....	½ inch and larger	₩ D 12½c
"	⅜ inch	₩ D 13 c
.....	¼ and 7-16 inch	₩ D 13½c
Tar'd Rope.....		₩ D 12 c
Lath Yarn.....		₩ D 12 c
Hay Rope.....		₩ D 12½c
Sisal.....	½ inch and larger	₩ D 10 c
"	⅜ inch	₩ D 10½c
"	¼ and 7-16 inch	₩ D 11 c
" Hay Rope.....		₩ D 10 c

Rules.

	Boxwood.	Ivory
Chapin's..	dis 60&10 %	dis 50&10 %
Standard....		
Stanley.....		
Stephens.....		

Sad Irons.
From 4 to 10 lbs.....₩ D 4½c net
Self Heating.....₩ doz $8.50 net
" Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Enterprise Patent Cold Handle.....dis 30 %
Mrs. Pott's Pat. Cold Handle, "Crown".....dis 30 %
Combined Fluter and Sad Iron..per doz $15.00, dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1½..$4.75 ₩ ream
" " " 2, 2½ & 3. 5.25 ₩ ream dis
" " Assorted 4.75 ₩ ream 20@
" " Star..... 3.75 ₩ ream 25 %
" " Emery..₩ ream $6.50 @ 11.50
New England, same list as B. & A. Flint.... dis 20@25 %
Gage's.....dis 20&5 %

Sash Cord.
Common.....₩ D 14 @ 20c net
Patent.....₩ D 10c net
Silver Lake Russia Flax.....₩ D 60c. dis 10 %
" White Cotton.....₩ D 60c. dis 10 %
" Drab Cotton.....₩ D 65c. dis 10 %
Raw Hide.....dis 25 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $5.00 per gross.....dis 33⅓%
Ferguson's.....dis 33⅓ %
Walker's.....net
Hammond's Window Springs.....dis 25 %
Northup Window Springs.....$2.00 per gross, dis 10 %
The Perfect, Clark & Smith, Plain Jap'd ₩ gro $10.00 net
" " Por. Knob Jap'd.₩ gro 14.00 net
" " Nickel-Plated...₩ gro 27.00 ne

Sash Weights.—Solid Eyes, in 500 ℔ lots and over.....₩ ℔ 1¾c net

Sausage Stuffers or Fillers.
Miles.....₩ doz $20, dis 30 %
Perry.....₩ doz, No. 1, $15; No. 0, $21, dis 30 %
Braw Cut No. 4.....each $30.00, dis 20 %
Enterprise Mfg. Co.....dis 20 %
Silver's.....dis 25 %

Saws.
Disston's Circular.....dis 35 %
" Mill.....dis 35 %
" Cross Cut.....dis 25 %
" Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning, Cross Cuts, new list.....dis 20 %
" One-Man, all lengths, " .....dis 20 %
" Billet Webs, 30 in. .....dis 25 %
" Lightning Buck Saws X Par.....dis 25 %
" Lightning Hand, Panel and Rip.....dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 20 %
W. M. & C. Mfg. Co. Cross-Cuts, except Monarch, dis 20 %
Livingston's Butcher and Kitchen.....dis 20 %
" Framed Wood—

Nos....	101	102	103	104	105
Per doz..	$10.00	5.50	10.00	7.50	6.25 net

Saw Frames.
White, Vermont.....₩ doz $1.35, dis 25 %
Red, Polished and Varnished.....₩ doz $2.00, dis 25 %
Saw Rods.....$10 list dis. 10&10 %

Saw Sets.
Boynton's Patent X Cut, per doz. $12.00; Hand Saw, per doz.. $10.00.....dis 20 %
Stillman's Genuine.....₩ doz $4.00@$5.50 dis 10 %
" Imitation.....₩ doz $3.25, dis 20&10 %
Common Lever.....per doz $2.00. dis 20&10 %
Leach's.....No. 0, $8.00; No. 1, $15.00, dis 15 %
Nash's.....No. 1, $8.50; No. 2, $5.50, dis 20&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
" Bemis & Call Co.'s New Pat.....dis 40&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
" " Plate.....dis 10 %
" " Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00. dis 60&10 %
" Imitation.....$7 00. dis 10 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %

Scales.
Hatch, Counter, No. 171.....₩ doz $36, dis 45 %
" Tea, No. 161.....₩ doz $12.00 dis 40 %
Union Platform.....$6 00. dis 45 %
Fairbanks'.....dis 20 %
Buffalo Scale Co.....dis 40 %
Howe's.....dis 20&5 %
Chatillon's Grocers'.....dis 45 %
" Eureka.....dis 25 %
Family Universal.....dis 50%
" Favorite.....dis 40 %
" Turnbull's.....dis 30 %
Scale Beams, Chatillon's list.....dis 10 %
" Sargent's list.....dis 40&10,%

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.50.dis 20&10 %
Box, 1 Handle.....₩ doz $5.00, dis 10 %
" 2 " .....₩ doz 6.00 dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 70&10 %
Ship (common).....per doz $3.00 net
" (Providence Tool Co.....dis 10 %

Screw Drivers.
Douglass Mfg. Co.....dis 20&10&10 %
Disston's.....dis 50 %
Disston's Patent Excelsior.....dis 50 %
Buck Bros.....dis 25 %
Stanley Rule & Level Cos., Varnished Hdls..dis 50&10 %
" " " Black Handles...dis 40&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet per doz., 4 in., $9.00; 5 in., $10.20; 6 in., $12.00 dis 30 %
Cowles Hdw. Co., No. 1 Extra.....dis 40&10 %
" " No. 1.....dis 50&10 %
" " Nos. 4 and 60.....dis 30 %

Screws.
Flat H'd Iron.....dis 45 %
Round Head Iron.....dis 35 %
Flat Head Brass.....dis 35 %
Round Head Brass.....dis 20 %
Brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 30&10 %
Coach Patent Gimlet Point, List per 100.....dis 50@55 %
Bed.....dis 50&10 %
Machine, Flat Head, Iron, Am. Screw Co.....dis 60 %
" Round Head, Iron, " .....dis 55 %
Bench, Iron.....dis 55 %
" Wood, Beech.....₩ doz $3.00, dis 15 %
" Hickory.....dis 20&10 %
Hand.....dis 20&10 %
Hand Rail, Sargent's.....dis 60&10&10 %
" " Humason, Beckley & Co's.....dis 50 %
" " Am. Screw Co.....dis 35 %
Jack (Wilson's).....dis 30 %

Screw Window Balances.
R. B. Bugunin's, Single gro., $23.94; 5 gro. $22.68, dis 5 %

Scroll Saws.
Lester, $10.00.....dis 20 %
Rogers, $3.50.....dis 30 %

Shears and Scissors.
Cast Iron, (American).....dis 60 %
Pruning.....see Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....dis 15 %
Cast Steel, List, Nov. 24, 1879.....dis 60 %
Seymour's " " .....dis 60 %
Heinsch's " " .....dis 60 %
" Tailors' Shears.....dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.....dis 75 %

Sheaves.
Sliding Door, M. W. & Co., list.....dis 50&2 %
" R. & E. list.....dis 60&10&2 %
" Patent Roller.....dis 10 %
" " Hatfield's...dis 60&10&2 %
" Russell's Anti-Friction ....dis 60&10&2 %
" Moore's Anti-Friction.....dis 40 %
Sliding Shutter, R. & E. list.....dis 60&10 &2 %
" " Sargent's list.....dis 55&10 %
Moore's Anti-Friction (Hanging).....dis 40 %

Shovels and Spades.
Ames. New list, Jan. 26, 1880.....dis 10 %
Russey Binns & Co., Patent.....dis 15 %
" " Association List.....dis 5 %
Old Colony (changes in list Oct. 15, '79).....dis 15 %
Remington's (Lowman's Patent).....dis 25 %
Rowland's.....dis 40 %
Griffiths.....dis 40&10 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 60&10&2 %
Polished Steel.....new list. dis 50&10&2 %

Slates.
Square Frames.....by case.....dis 70 %
Less than a case.....dis 65&10 %

Spoke Shaves.
Defiance Metallic.....dis 30&10 %
Iron.....dis 40 %
Wood.....dis 30 %
Bailey's (Stanley R & L. Co.) new list..... dis 20&10 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00 dis 40&5 %
Stearn's.....₩ doz $10.00, dis 40 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 50&10 %
Douglass'.....₩ doz $4.00, dis 15 %

Spoons.
Pat. Thread Basting.....dis 30 %
" Riveted Table and Tea.....dis 40 %
Solid Table and Tea.....dis 50 %
Britannia.....dis 50 %
The Wm. Rogers Mfg. Co.....dis 33⅓&5 %
Reed & Barton.....dis 33⅓&5 %
Hall & Elton.....dis 33⅓&5 %
Holmes, Booth & Haydens.....dis 33⅓&5 %
German Silver.....dis 25&10 %
Cast Steel, Sil. Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
" " Tables.....$2.00 ₩ gross, net
Tin Cowles Hdw. Co.).....dis 10 %
" " " case lots.....dis 20 %

Stocks and Dies......dis 5&10 %
"Lightning" Screw Plate.....dis. 10 %

Stone.
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ D 6c. dis 33⅓&10 %
Washita Stone.....No 1, ₩ D 18c net
" .....No 2. ₩ D 15c net
" Slips.....No. 1, ₩ D 36c net
Washita Stone (Boyd & Chase).....No. 1 ₩ D 14c net
" " Slips (Boyd & Chase).....30c net
" " mo'ted (Boyd & Chase) 6, 7 & 8 in, dis 30 %
" " No. 2.....₩ D, 13c, net
" " No. 3.....₩ D 14c net
Arkansas Stone No. 1, 4 to 6 in.....₩ D $1.35 net.
" " No 1, 6 to 9 in.....₩ D $2.00 net
Turkey Oil Stone (Boyd & Chase)....4 to 8in, $1.00 ₩ D, dis 10 %
" Slips " ....$2.50 ₩ D, dis 10 %
Lake Superior (Boyd & Chase).....₩ D 20c, dis 10&5 %
" Slips " .....₩ D 45c, dis 10&5 %
Grindstones, Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $5.75 net
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 5 %
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $5.75, net
Dixon's Plumbago.....₩ D 8c. net

Squares.
Steel.....dis 50 %; full cases, dis 50&10 % } 2 %
Iron.....dis 50 %; full cases, dis 50&10 % } cash
Nickel Plated.....add $2.50 @ $4.00 ₩ doz, net }
Try Squares and T Bevels.....dis 45&10 %
Disston's Try Squares and T bevels.....dis 52½ %
Winterbottom's Try and Mitre.....dis 20&10 %

Tacks, Brads, &c.
List of April 2, 1880:

Tinned Swedes Tacks	dis 35 %
Tinned American "	dis 45 %
Swedes Tacks, all kinds	dis 20 %
Copper Tacks and Nails	dis 25 %
Swedes Hungarian Nails	dis 20 %
American " "	dis 20 %
Gimp and Lace Tacks	dis 20 %
Finishing Nails	dis 15 %
Trunk and Clout Nails	dis 15 %
Common and Patent Brads	dis 10 %
Basket Nails	dis 15 %
Brush Tacks	dis 10 %
Leathered Carpet Tacks	dis 20 %
American Cut Tacks	dis 20 %
Cigar Box Nails	dis 20 %
Chair Nails	dis 20 %
All other Tack List goods	dis 20 %
Double-Pointed Tacks	dis 40&5 %

Extra 10 % on all.

Tap Borers.
Common and Ring.....dis 15 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 20 %

Tapes, Measuring.
American.....dis 20 %
Spring Tapes.....dis 25&10 %

Thermometers.
Tin Case.....dis 70 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20 %
Wood Bottom.....₩ doz $12.00, dis 33⅓ %
All Iron.....₩ doz $10.50, dis 40 %
Nashua Lock Co.'s.....₩ doz $18.00, dis 50 %

Toe Calks.—Winsted.....₩ D 9c. dis 5

Tinners' Tools and Machines.
Machines (P. S. & W.).....list add 12½ %
Tools (P. S. & W.).....dis net

Transom Lifters.
Wollensak's Patent.....dis 20 %

Traps.
Game, Newhouse.....dis 30 %
" Newhouse Pattern.....dis 45 %
" Blake's Patent.....dis 40 %
Mouse, Wood, Choker.....₩ doz holes, 10@60
" Round Wire.....₩ doz $1.50, dis 10 %
" Cage " .....₩ doz $2.50, dis 10 %
" Catch-em-alive.....₩ doz $2.50, dis 10 %
Rat. "Decoy".....per doz $10.00, dis 10 %

Trowels.
Lothrops Brick and Plastering.....dis 20 %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 30 %
Peace's Plastering.....dis 30 %
Clement & Maynard's.....dis 10@15 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 20 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 45 %

Triers.
Butter and Cheese.....dis 25%

Vises.
Solid Box.....List of July 1, '79 dis 25 %
" "Crown" (A. H. Hildick) 40 to 100 ℔, 15c net
" Peter Wrights.....15½c
Parallel, Parker's.....dis 10 %
" Wilson's.....dis 40 %
" Howard's.....dis 20&10 %
" Merrill's.....dis 15 %
" Sargent's.....dis 50&10 %
" Trenton.....dis 20 %
" Backus and Union.....dis 40 %
" Oval Slide.....dis 40 %
" Fisher & Norris.....dis 15&10 %
" Prentiss.....dis 25 %
" Stevens'.....dis 20 %
" Simpson's Adjustable.....dis 25 %
"Family." List.....net
Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10 %
" Stearn's.....dis 20&10 %
" Hopkins'.....₩ doz $17.50 dis 10 %
Lowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

Washer Cutters.
Smith's Patent.....₩ doz $12.00 dis 25 %
Johnson's.....₩ doz $12.00. dis 33⅓ %
Penny's.....₩ doz $14.00 and $16.00. dis 45 %
Appleton's.....₩ doz $8.00, dis 20&10 %

Washers.—See Nuts and Washers.

Well Wheels.—Revised list.....dis 60&10%

Wire.

Brass and Copper.....	List of June 10, 1880....	dis 20 %
Bright and Annealed.....	Nos. 0 @ 18.	dis 45 @ 50 %
" "	Nos. 19 @ 26,	dis 52½ @ 57½ %
" "	Nos. 27 @ 36.	dis 60 @ 65 %
Coppered.....	Nos. 0 @ 18.	dis 40 @ 45 %
Galvanized, Nos. 0 to 6.....		₩ D 10c, dis 35 @ 37½ %
" Nos. 7 to 18.....	market list.	dis 35 @ 37½ %
Tinned, Nos. 0 to 18.....		dis 37½ @ 42½ %
Cast Steel.....		dis 25 @ 30 %
Tinned Broom Wire, Nos. 18 to 26.....		dis 47½ @ 50 %
Annealed Fence, Nos. 8 and 9		dis 44 @ 50 %
" Grape, Nos. 10 to 14.		dis 45 @47½ %
Galvanized Telegraph, Nos. 7 to 9		₩ D 9c
" " Nos. 10 and 11.....		₩ D 10c
" " No. 12		₩ D 10½ c
Fence Staples.....		₩ D 7¼@ 7½c
" Staples, Galvanized.....		₩ D 8¼ @ 8½c
Stubs Steel Wire.....		$7.00 to 2
Japanned Barb Fence.....		₩ D 9c
Galvanized "		₩ D 10c
Steel Music Wire, Nos. 12 to 27.....		₩ D $1.25, net
Turner & Seymour Mfg. Co., Picture Wire..dis 80&20 %		
Judd's Picture Wire.....		dis 80&20 %
Clothes Line Wire, Galvanized.....		₩ coil 32@40c net
Wire Cloth, greenand drab.....		₩ sq. ft, 3½ c net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "B,".....list Jan., 1880. dis 20%
" Diagonal.....dis 20%
Coes 'Genuine.....dis 50 %
" "Mechanics".....dis 50&10 %
" Pattern, Malleable.....dis 70 %
Girard Standard.....dis 50&10 %
Girard Agt. .....60&10 %
Bemis & Call's Patent Combination.....dis 20 %
" " Merrick's Pattern.....dis 35 %
" " Briggs' Pattern.....dis 25 %
" Cylinder or Gas Pipe.....dis 40 %
Van Wagoner & Williams' Basin .....per doz $4.50
Aiken Pocket (Bright).....$6.00, dis 60&10 %
The Favorite Pocket (bright).....per doz $8, dis 60 %
Webster's Pat. Combination.....dis 35 %

Wringers.

		Per doz.
Universal, XX	No. 3½	$50.00
" "	No. 2	63.00
" "	No. 1½	71.00
" "	No. 1	93.00
" "	No. 8. each,	12.00
" "	No. 12. "	20.00
" "	No. 18. "	25.00
" "	No. 22. "	32.00
Peerless, No. 0, no Cogs		51.00
" No. 1, "		54.00
" No. 2½, with Cogs		60.00
" No. 2, "		63.00
" No. 3, "		71.00
" No. 4, "		96.00
Unique, No. 0		57.00
" No. 1		54'00
Eureka, No. 1		54.00
Novelty, No. 10, with Cog Wheels		60.00
" No. 2, "		63.00
Excelsior, No. A, with Folding Bench		75.00
" No. E, for Set Tubs		90.00

NEW YORK WHOLESALE PRICES, September 1, 1880.

METALS.

IRON.—DUTY: Bars, 1 to 1¼c. ₩ lb; Sheet, Band Hoop and Scroll, 1¼ to 1¾c. ₩ lb; provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₩ ton; Polished Sheet, 3c. ₩ lb; Wrought Scrap, $8 ₩ ton; Cast Scrap, $6 per ton. Railroad, 70c. ₩ 100 lbs. Boiler and Plate, 1½c. ₩ lb.

Iron—AMERICAN

Foundry No. 1....	(Nominal.)	₩ ton	$26.00 @ 28.00
" No. 2X ...	"	₩ ton	23.00 @ 24.00
Gray Forge.	"	₩ ton	21.00 @ 22.00
SCOTCH.			
Eglinton.....	(Nominal)....	₩ ton	22.50 @ 23.00
Coltness.....	"	₩ ton	25.00 @ 26.00
Glengarnock.....	"	₩ ton	24.50 @ 25.00
Gartsherrie	"	₩ ton	24.00 @ 25.00

Rails.

Iron.....(nominal).....		₩ ton	$..... @ .....
Steel.....nominal).....		₩ ton	60.00 @ 63.00
Old Rails Ts (nominal).....		₩ ton	28.00 @ 29.00

Scrap.

Wrought Scrap ₩ ton.....27.00 @ 28.00

Bar Iron, from Store.—Nominal Prices.

Common Iron:

¾ to 2 in. round and square.....	₩ lb 2.40
1 to 6 in. x ⅜ to 1 in.....	
Refined Iron	
¾ to 2 in. round and square.....	₩ lb 2.60
1 to 6 in. x ¼ to 1 in.....	
1 to 6 in. x ¼ and 5-16.....	₩ lb 2.80
Rods—¾ and 11-16 round and square.....	₩ lb 3.30
Bands—1 to 6x3-16 to No. 12.....	₩ lb 3.30
Norway Nail Rods.....	7. c

Sheet Iron.

	Common American	R. G. American.
Nos. 10 to 20.....	₩ lb 3¾ @	5
21 to 24.....	₩ lb 4 @ c	5¼
25 to 26.....	₩ lb 4¼c	5½
27.....	₩ lb 4½c	5¾
28.....	₩ lb 4¾c	5¾

	B.B.	2d qual.
Galvanized, 10 to 20.....	₩ lb 8c	7c
21 to 24	₩ lb 9c	8c
25 to 26	₩ lb 10c	9c
" 27	₩ lb 11c	10c
" 28	₩ lb 12c	11c

Patent Planished..... ₩ lb 12c; B, 10½c
Russia.....13@15 c
American Cold Rolled..... ₩ lb 5½@6½c

COPPER.—DUTY: Pig, Bar and Ingot 1, 5c; Old Copper 4c lb; ₩ Manufactured (including all article of which Copper is a component of chief value), 45 % ad valorem.

American Ingot.....₩ lb See Trade Report.

SHEATHING, BRAZIERS' COPPER, BOLTS, &c.

Braziers' Copper, ordinary sizes, 1000. per sq. ft., and over per lb.....28c
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz.. ₩ sq. ft..... ₩ lb 30c
Braziers Copper 10 oz and 12 oz., ₩ sq. ft. ₩ lb 32c
" Lighter than 10 oz. ₩ sq. ft .. ₩ lb 34c
Circles less than 84 in. n diameter ..... ₩ lb 31c
Circles 84 in. diameter and over..... ₩ lb 34c
Segment and Pattern Sheets ..... ₩ lb 31c
Locomotive Fire Box Sheets..... ₩ lb 28c
Sheathing Copper, over 12 oz. ₩ sq. ft..... ₩ lb 26c
Bolt Copper... ₩ lb 28c
Copper Bottoms..... ₩ lb 31c
No Copper is Sheathing except 14x48 inches and not o exceed 34 oz. to the sq. ft.

TINNING.

14x48..... ₩ sheet 60
All other size Sheets, 2½c. per square foot.
For tinning both sides, double the above amount

O'NEILL'S PATENT PLANISHED COPPER.—Net.

1 x 48.

4 and 16 oz. and heavier..	₩ lb 36c By the case. ₩ lb 35c
2 oz. and lighter.....	₩ lb 39c " " ₩ lb 38c

Boiler Sizes.

7 in., 14x52. 8 in., 14x66. 9 in., 14x60.

4 and 16 oz. and heavier.	₩ lb 38c By the case. ₩ lb 37c

(And all sizes not over 20 in. wide.)

30x60.

4 and 16 oz. and heavier.....	₩ lb 40c
2 oz.....	₩ lb 43c

Brass.

Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis 20%.

June 10, 1880.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c ₩ lb.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in.....30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive.....35c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive.....38c
½c ₩ lb advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass, at...53c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in.37c
Printers' Rules.....45c
Sheets wider than 30 in. and under 40 in.....47c
" 40 in. and over.....50c
Circular Sheets, in diam. from 4 in. to 14, inclusive..40c
" " over 14 " 20, " ..45c
" " " 20 " 30, " ..49c
" " " 30 " 40, " ..55c
" " " 40 in.....59c

LOW BRASS.

4c ₩ lb more than High Brass,
Gilding Metal, 8c ₩ lb more than High Brass.

Platers' or Gold Metal	In Bars.....	48c
	Sawed.....	51c
	Planed or Polished.....	54c

FOR SLITTING.

Metal in width 2 in. to ⅛ in. to No. 28, inclusive, 1c. ₩ lb advance.
Metal, in width 2 in to 1 in., thinner than No. 28, 2c. ₩ lb advance.
Metal, in width 1 in. to ⅛ hinner than No. 28, 3c ₩ lb advanc
Metal, in width ⅛ in. to ¼, inclusive, not thinner than No 28, 2c. ₩ lb advance.
Metal, in width ⅛ in. to ¼ thinner than No. 28, 5c. ₩ lb advance.
Metal, ¼ in. in width and less, 10c. ₩ lb advance.
Any of the above widths cut to particular lengths, add 7c. ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
4 per cent., 12 inch, to No. 26.....	$0.52	$0.70
6 " " "	.56	.76
10 " " "	.64	.88
14 " " "	.74	1.03
18 " " "	.80	1.12

German Silver Sheets over 12in. wide and weighing more than 10 lbs., $2.00 ₩ lb.
Advance 2c. for each additional inch in width above 12 in., and 2c. ₩ lb on each No. thinner than Nos. 26 to 36, inclusive
All German Silver thinner than No. 36 is Platers, at 50c ₩ lb additional.
German Silver Scrap one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No.0 to 20.....	$0.33	$0.37	$0.13
No.21.....	.36	.40	.46
No.22.....	.37	.41	.47
No.23.....	.38	.42	.48
No.24.....	.40	.44	.50
No.25.....	.43	.47	.53
No.26.....	.45	.49	.55
No.27.....	.48	.52	.58
No.28.....	.52	.60	.63
No.29.....	.55	.59	.66
No.30.....	.58	.62	.72
No.31.....	.62	.66	.78
No.32.....	.66	.70	.84
No.33.....	.70	.74	.93
No 34.....	.74	.78	1.03

Spring Wire 2c ₩ lb advance.
Flat, Square and Half Round Wire 5c ₩ lb advance on Round Wire.
Fancy Wire not less than 10c ₩ lb advance of Round Wire.
Brass Rods, No. 8 and larger not less than 2 feet lengths, 35c.
Wire straightened and cut, smaller than No. 8, and not less than 2 feet lengths, 43c.
Wire and Rods less than 2 feet lengths, special rates
Twelve cents per lb extra for spooling on 1 lb spools

MISCELLANEOUS.

Brass Pail Ears.....$0.50
Brass Door Rail.....43

SCRAP.—dis. 20 %

High Brass Scrap.....12c
Low " 14c
Gilding.....10c
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis 20 % ₩ lb

Plain, No inclusive above ¼ in. to 3 in.....	$0.43
" above 3 in.....	.53

Nos. 21, 22, 23, two cents advance on List for each Number.
Os. 24, 25, 26, four cent advance on List for each Number.
Above No. 26, special rates.

Plain, ¼ inch.....	.70
" 3-16 "	1.10
" ⅛ "	1.60

Mandrel Drawn Tubes, 5 cents advance on List Prices.

Fancy Tubing to No 20.....	50c
English, Scotch and Extra Patterns Fancy Tubing to No. 20.....	.55

Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ½ cent for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ⅜ in. 25 cents per pound advance.

ZINC TUBING.—dis 20 %.

Plain.....	.27
Fancy.....	.33
Scotch and Extra Patterns.....	.40

GERMAN SILVER TUBING.—dis 10 %

4 Per cent.....	.80
6 "	.90
9 "	1.05
12 "	1.20
15 "	1.35
16 "	1.40
18 "	1.50
20 "	1.60

STEEL.—DUTY: Bars, Ingots, Sheets and Coils valued at 7 cents ₩ lb., or under, 2¼ cents; over, 7 cents, and not above 11, 3 cents ₩ lb; over 11, 3½ cents ₩ lb, and 10 % ad val. Railway Bars, 1¼ cents ₩ lb. Railway Bars, in part Steel, 1 cent ₩ lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.—

" Best Cast.....	₩ lb 15½c
" Extra Cast.....	₩ lb 16½c
" Round Machinery, Cast.....	₩ lb 10c
" Swaged, Cast.....	₩ lb 18c
" Best Double Shear.....	₩ lb 15½c
" Blister, 1st quality.....	₩ lb 13c
German Steel, Best.....	₩ lb 11c
" 2d quality.....	₩ lb 10c
" 3d quality.....	₩ lb 9c
Sheet Cast Steel, 1st quality.....	₩ lb 15½c
" 2d quality.....	₩ lb 14½c
" 3d quality.....	₩ lb 12½c

ANTIMONY.....See Trade Report

LEAD.—DUTY Pig $2 ₩ 100 lbs; old Lead, 1½c lb ₩ Pipe and Sheet, 2½c ₩ lb.

American.....	6¼ @ 5¼c
Bar.....	.60 net
Pipe.....	6½c dis 10 %
Tin Lined Pipe.....	14c. dis 10 %
Sheet.....	7c. dis 10 %
Shot.....	Drop 7½c. Buck, 8½c
Chilled Shot.....	8½c

BABBITT METAL.

N. P. U.....	₩ lb @ 80

A. 25c; B, 20c; C, 15c.

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1.10 ₩ lb; Electro-galvanized Plates, 2c ₩ lb; Manufactures of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent

Banca.....	23 ₩ lb 22c
Straits	₩ lb 22c
English	₩ lb 22c

TIN PLATES.

I C 10x14 } 14x20 }	Prime Charcoal.....	$6.75 @ 7.00
I C 12x12	"	7.00 @ 7.25
I X 10x14 } 14x20 }	Charcoal.....	8.75 @ 9.00
I X 12x12	" "	
D C 12½x17	.....	6.25 @ 6 50
D X 12½x17	.....	8.25 @ 8.50
For each additional X add.....		2.00

COKE TIN PLATE.

	Best.	Ordinary.
I C 10x14 } I C 14x20 }	$6.00	5.50 @ 5.75
I C 12x12.....	6.25	5.50 @ 5.75

TERNE PLATE

	Prime Char.	2d qual.	Coke.
I C 14x20...	$6.25	6.00	5.50 @ 5.75
I X 14x20.....	8.25	....	...
I C 20x28.....	13.00	12.50	11.50 @ 12.00
I X 20x28.....	16.50	....	...
I C 20x200.....	22.00	.. ..	....
I C 14x20 M. F. Brand			8.25 @ 8.40

SOLDER.....No. 1, 12c @ 13 c; No 2, 11c

SPELTER—DUTY: in Pigs, Bars and Plates, $1.50 ₩ 100 lbs.

American, cash	5¼ c
Bergen Port from Lehigh Ore.....	10c
Lehigh, on spot.....	9c

ZINC.—DUTY: Pig or Block, 1.65 ₩ 100 lbs. Sheet: 2½c ₩ lb.

Sheet, Cask	7¾ @ 7¾
" Ounce.....	8 @ 8½

Paper Stock, &c.

(Dealer's Selling Price.)

Canvas linen.....	4 @
White cotton, new.....	4½ @
" No. 2.....	3½@4
White linen rags No. 1.....	4 @
" No. 2.....	2¾ @
Seconds	2¼ @
Soft woolens	.12 @ 1
Gunny bagging.....	3¾ @
Jute Butts	3 @ 3½
Kentucky bagging.....	4½@5
Waste paper and scraps.....	1 @ 1½
Rope cuttings.....	1½ @ 3
Kentucky bale rope.....	4 @ 4½
Grass rope	3¼ @ 3½
Tarred shaking.....	1¾ @
Hard White Shavings, No. 1.....	4½ @ 4¾
Soft " No. 1.....	4 @ 4½
White Shavings, No. 2	3¾ @
Mixed " part white.....	3½ @
Imperfections, No. 2, best folded sheets.....	3¼ @
" No. 1, Heavy Stock	3¼ @
Book Stock.....	3¼@
" Heavy.....	3½ @
" Light.....	1½ @ 1¾
Newspapers.....	2¾ @ 2½
Prints.....	1½ @
Pure Manilas	2¾ @ 3
Bogus Manilas and Hardwares.....	$1.25 @ 1.40
Commons.....	.90 @ 1.00
Binders' Board Cuttings.....	1.00 @ 1.25
Straw Board Cuttings, clean.....	1.00
Woolen Tailor Clips.....	.18 @ 19
Satinet	2½ @ 3½

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters.....	₩ lb 20c
" " Ordinary.....	6c
" Ivory Drop, fair.....	12 @ 15c
" best.....	23c
Black Paint, in oil.....kegs 8c asst'd cans, 11c	
Blue Prussian, fair to best.....	40 @ 45c
" " in oil.....	45 @ 55c
Blue Chinese dry.....	83c
" Ultramarine.....	18 @ 20c
Brown, Spanish.....	1½c
" Van Dyke.....	10@12c
Carmine, 40.....	combination price
Green, Chrome.....	15 @ 23c
" in oil.....	14 @ 18 @ 25c
" Paris.....	good, 25c; best, 30c
" in oil.....	30c; 44c
Iron Paint, Bright Red.....	₩ lb 2½c
" Red.....	₩ lb
" Brown.....	₩ lb 2½c
" Purple.....	₩ lb 3c
" Ground in Oil, Bright Red.....	₩ lb 5½c
" " " Red.....	₩ lb 5c
" " " Brown.....	₩ lb 4½c
" " " Purple.....	₩ lb 6c
Mineral Paints.....	1¾ @ 4c
Orange Mineral.....	15c
Red Lead, American.....	7½c
" English.....	none in market
" Venetian (N. C.) dry.....	$1.65 @ $1.70
" in oil.....asst'd cans, 11c; kegs, 8c	
" Indian dry.....	9 @ 12c
Rose Pink.....	10 @ 13c
Sienna, American, raw.....	4c
" Burnt.....	4½c
" " in oil.....	10 @ 16 @ 20c
" Raw.....	11 @ 14 @ 25c
Umber, Burnt.....	9 @ 12 @ 16c
" " in oil.....	9 @ 12 @ 16c
" Raw.....	3½ @ 7½c
" " in oil.....	10 @ 16 @ 18c
Vermillion, Chinese.....	90c
" English.....	65 @ 57½c
" Trieste.....	1.10c
" American, Common.....	15c
White Lead, American, pure dry.....	8½c
" " in oil.....	9 to 9½c
White, Paris, English, prime.....in bbls. 2 @ 2½c	
Yellow Ochre, French.....	$1.75
" " in oil...asst'd cans, 11c; kegs, 8c	
" " Vermont.....in casks, 1½c	
Yellow Chrome.....	17 @ 27c
" " in oil.....	14 @ 18 @ 25c
Zinc White American No. 1, dry.....	5 @ 5½
" No. 1, in oil.....	9c
" French (Paris).....	8 @ 10c
" in oil.....	@ 10c

Oils.

Linseed, Raw, in casks and bbls.....	gal. 59c
" Boiled, " "	62c
Bleached Whale.....	₩ gal. 59c
" Sperm.....	₩ gal. $1.15
" Elephant.....	65c
Signal.....	55c
Prime Lard.....	66c
No. 1	49c
West Virginia.....	16c @ 22c
Drilling.....	40c
Empire Cylinder.....	95c
Miners' Oil.....	40 to 42c
Fish Oil, pressed.....	56c
Neatsfoot.....	74c
Tallow.....	82c
Machinery	40c
Engine.....	50c

Sundries.

Asphaltum.....	9c
Benzine.....	₩ gal 15c
Chalk.....	3½c
" Block.....	5½c
Dryer, Patent, Am'n..... asst cans, 10½c; kegs, 9c	
Frostings.....	50c
Glue, White.....	33 @ 44c
" Sheet.....	20c
Glaziers' Points, Zinc.....	8c
Gum, Copal.....	36c
" Damar.....	25c
" Shellac, English.....	16c
" " dark.....	42c
Litharge, English.....	7½c
Mineral Wool.....	₩ lb 1¼ @ 1½c
Pumic Stone, selected Lumps.....	4 @ 6c
" powdered.....	2½c
Putty, in bladders.....	3 c
" in bulk.....	2½c
Spirits Turpentine.....	32c
Whiting Spanish.....	¾c

Glass.

FRENCH WINDOW GLASS.

Prices current per box of 50 feet.

Single Thick.—Discount 50 & 5 %

SIZES.	1st.	2d.	3d.	4th
6 x 8 to 10 x 15.....	$ 8.00	$ 6.75	$ 6.25	$ 5.75
11 x 14 to 16 x 24.....	8.75	8.00	7.50	7.00
18 x 22 to 20 x 30.....	11.25	10.50	9.75	8.75
15 x 36 to 24 x 30.....	12.75	11.50	10.00	
26 x 28 to 24 x 36.....	13.50	12.25	11.25	
26 x 36 to 26 x 44.....	14.75	13.75	11.75	
26 x 46 to 30 x 50.....	16.25	15.00	13.00	
30 x 52 to 30 x 54.....	17.25	16.00	13.50	
30 x 56 to 34 x 56.....	18.75	16.75	15.00	
34 x 58 to 34 x 60.....	19.50	18.00	16 00	
36 x 60 to 40 x 60.....	21.00	19.50	18.00	

Double Thick.—Discount 60 & 15 %

SIZES.	1st.	2d.	3d.	4 th.
6 x 8 to 10 x 15.....	$12.00	$11 00	$10.00	$ 9.25
11 x 14 to 16 x 24.....	14.75	13.75	12.75	11.75
18 x 22 to 20 x 30.....	19.00	17.75	16.00	
15 x 36 to 24 x 30.....	21.50	19.25	16.50	
26 x 28 to 24 x 36.....	23.00	20.75	18.25	
26 x 36 to 26 x 44.....	24.00	23.00	19.25	
26 x 46 to 30 x 50.....	27.00	25.00	21.25	
30 x 52 to 30 x 54.....	28.50	26.00	22.25	
30 x 56 to 34 x 56.....	30.00	27.75	24.75	
34 x 58 to 34 x 60.....	31.75	30.00	27.00	
36 x 60 to 40 x 60.....	35.00	32.50	30.25	

Sizes above 40 x 60—$10.00 per box extra for every five inches.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches will be charged in the 84 united inches brack et

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STEEL Gautier Steel.

See Page 3.

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BENJAMIN ATHA & CO.,

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And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

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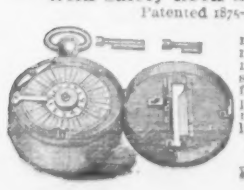

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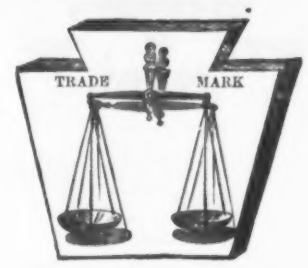
KEYSTONE SAW, TOOL, 

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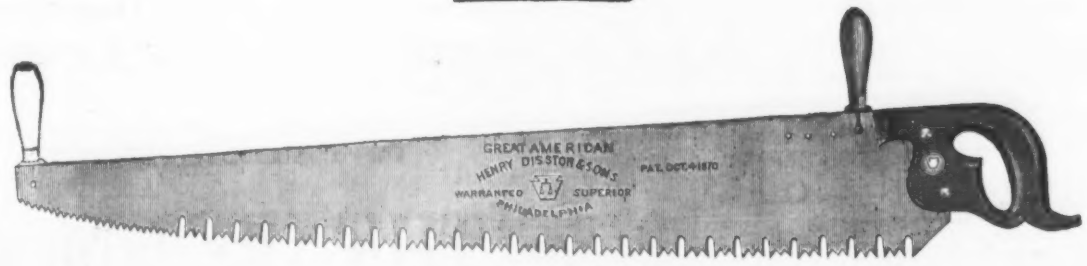

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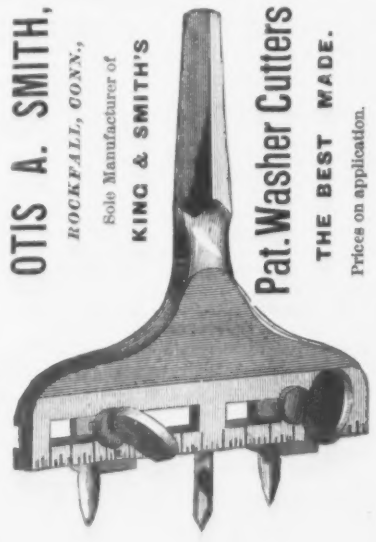

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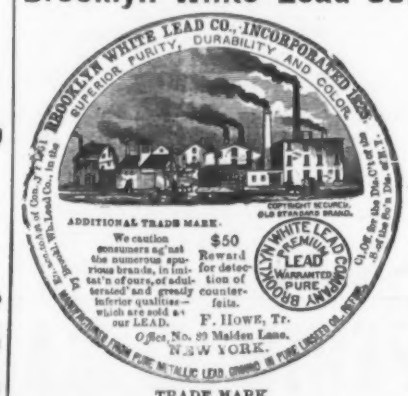

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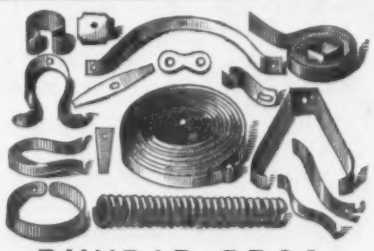

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Peter Wrights, ₩ lb.....10½c
Over 250 lbs.....11c
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Apple Parers.
Keystone Centennial, 1875.....$4.25
" " 1877.....5.00
Reading No. 72.....5.00
" No. 74.....6.00
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" No. 76.....7.50
Rotary Peach Parers.....14.40
Lots of 10 to 25 dozen special prices.

Axes.
Hunt's Kentucky and Yankee.....per doz $11.00
Mann's Red Warrior....." 11.00
Richland Chief....." 10.00
Beveled Axes.....add 50c " net
Double Bit Axes.....net " 22.00

Augers and Auger Bits.—New List January 1.
Bates' Nut Augers.....dis 40 %
Cook's Augers.....dis 40&10 %
Watrous' Ship Augers.....dis 15 %
Benjamin Pierce Auger Bits.....dis 35 %
Griswold Auger Bits.....dis 40 %
Cook's " .....dis 40&10 %
Jennings' " .....dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ₩ doz..dis 25&10 %
Stearns' Pat. Hol. Augers, list $42 ₩ doz....dis 20&10

Balances.
Light and Common.....dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells.....dis 60&10 %
Swiss Pattern Hand Bells.....low list dis 40&10 %
Connell's Door Bells.....dis 35 %
Gt. Western & Kentucky Cow, new list.....dis 50 %

Bolt and Rivet Clippers.
Chambers' No. 1. for ⅝ bolt.....each, $7.50 } dis 15 %
" No. 2, " ⅞ " ..... " 9.00 }
" No. 3, " ⅞ " ..... " 12.00 }

Boring Machines.
Upright, without Augers.....List 5 50 } dis 33⅓ %
Angular, without Augers..... " 6.75 }

Bolts.—Eastern Carriage Bolts.....dis 7½ & 10%
Philadelphia " .....new list dis 60&10 %
Stanley, Wrought Shutter.....dis 50&10 %

Braces.—Barber's.....dis 40&5 %
Backus.....dis 60 %
Spoffard.....dis 50&5 %
American Ball.....dis 40&10 %

Butts.—Cast Fast Joint. Narrow.....dis 40&10 %
" " Broad.....dis 40&10 %
Cast Loose Joint, Narrow.....dis 50&10 %
" " Broad.....dis 50&10 %
" Acorn, Loose Pin.....dis 50&10 %
" " Jap'd.....dis 50&10 %
" Mayer's Loose Joint.....dis 45&10 %
Wrought Loose Pin.....dis 50&10 %
" Table Hinges and Back Flaps.....dis 40&10 %
" Narrow, Fast.....dis 40&10 %
" Loose Joint.....dis 50&10 %

Blind Butts.
Parker.....dis 60&10 %
Clark.....dis 60&10 %
Shepard.....dis 60&10 %
Lull & Porter.....dis 60&10 %
Huffer's.....dis 45 %

Chains.—German Halter and Coil, new list Oct. 22, 1879.....dis 40 %
Galvanized Pump.....₩ lb 10c net
Best Proof Coil Chain—English.

₩ lb	13	10	8¼	7¼	7¼	7	gold
	3-16	¼	5-16	⅜	7-16	½	in.

Chisels.—Socket Framing.....dis 65&10 %
Socket Firmer.....dis 65&10 %
Butcher's.....$5.00 to 2 gold

Casters.—Bed (new list July 1, 1880).....dis 25&10 %
Plate.....dis 25&10 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880.....dis 35 %
Enterprise.....dis 20 %

Cutlery.—Walden Pocket.....new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s.....dis 65&10 %
Adjustable Handle.....dis 15 %

Fry Pans.
Tinned.....dis 45 %

₩ doz.	$3.50	4.00	4.50	5.00	5.50	6.50	7.50	9.00	10.00
No.	0	1	2	3	4	5	6	7	8

Burnished.....dis 55 %

₩ doz.	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.50	9.00
No.	0	1	2	3	4	5	6	7	8

Files.
Nicholson.....dis 30 %
Disston.....dis 30 %
Butcher.....$4.50 £
Spencer.....$4.50 @ 4.75 £

Fluting Machines.
Eagle—3½ in. roll.....each, $2.15 } dis 10 %
" —4½ in. roll..... " 2.85 }
Crown—4½ in. roll..... " 3.50 }
" —6 in. roll..... " 4.00 } dis 20 %
" —8 in. roll..... " 6.50 }
Geneva Fluter.....dis 20 %
Favorite corn Fluter & Sad Iron.....₩ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list.....dis 30 %

Hatchets.
Yerkes & Plumb, new list.....dis 30 %
Hunt.....dis 15&5 %

Hinges.
Strap and T.....dis 45&10 %

Horse Nails.

	Nos.	5	6	7	8	9	10
Ausable		30	27	25	24	23	22
" Pol'ed & P't'd and Blued and Pointed.		31	28	26	25	24	23
Globe	New list.	28	25	23	22	21	20
Clinton		22	20	19	18	17	
" Polished & Pointed		23	21	20	19	18	

Porter, all sizes.....₩ lb 15c. net
Discount on Ausable and Clinton, 20 %; Globe, 10%

Locks and Knobs.
Branford.....dis 50&2 %
Gaylord Cabinet.....dis 10&2 % cash
American Padlocks.....dis 45&2 % cash
Scandinavian Padlocks.....dis 50 %

₩ doz..	$5.00	5.50	6.50	7.50	8.50	10.00	12.50	} dis 60 %
No.....	57	58	59	60	61	62	63	
₩ doz.				$18.00		26.00	35.00	} dis 60 %
No.				64		65	66	

Lanterns.
Nail City.....₩ doz, $9.00 net
Square Candle and Oil.....₩ doz
Tubular.....No. 0, $9.05; No. 1, $11.30 ₩ doz net
Globes, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania.....dis 30&10 %
Philadelphia.....dis 30&10 %
Excelsior.....dis 30&10 %

Lawn and Garden Pumps.
Holland Patent.....List $5.00 dis 10 %

Mattocks.
Long and Short Cutter.....new list
Pennsylvania Pattern.....per doz

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets.....dis 20 %
Stebbins' Gates.....dis 50&10 %
Lincoln's " .....dis 60&10 %
Landers, Frary & Clark's Petroleum.....dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1880.....dis 40 %
Cork Lined " .....dis 70 %

Meat Cutters.—Pennsylvania Meat Cutter..dis 50 %
Dixon's.....dis 30 %
Woodruff.....dis 30 %
Stowe.....dis 30 %
Hale's.....new list, dis 40, 2½10 cash
American.....dis 25 %
Stuffers.....dis 25 %
Enterprise Stuffers.....dis 20 %

Planes.—Ohio Tool Co.....dis 25 % } 10 % cash
Scioto.....dis 30 % } in 10 days.
Auburn.....dis 25 % }
New York Tool Co.....dis 30 %
Bailey.....dis 20&10 %

Piane Irons.—Ohio Tool Co.....dis 10&5 %
Butcher's.....£, $5.50

Plumbs and Levels.
Stanley's Adjustable.....dis 60&10 %
" Non-Adjustable.....dis 60&10 %

Picks.—New list.....

Pumps.—Bickford.....$5.00, dis 10 %

Rules.—Stanley Boxwood.....dis 60&10 %
Stanley Ivory.....dis 40&10 %

Steelyards.—Hart's Pattern.....dis 30&10 %

₩ doz.....	$14.40	17.75	21 00	26.40	31 00	35.40
Lbs.....	50	100	140	200	250	300

American Pattern.....dis 30&10 %

₩ doz.....	$8.00	10.25	13.75	15.60	16.75	19.50
Lbs.....	50	100	140	200	250	300

Squares.
Steel and Iron.....dis 50 %; full case, dis 50&10 %
Try Squares, Stanley.....dis 45&10 %
Disston's Try Squares.....dis 50 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened.....₩ doz $9.00 net
Clipper No. 10, Bronzed Blade, Boxed and Sharpened.....₩ doz $8.50 net
Clipper No. 5, Painted Red, Boxed and Sharpened.....₩ doz $8.00 net

Saws.—Disston's Hand, Panel and Rip.....dis 20 %
Disston's Circular.....dis 35 %
" Cross-Cut No. 2, Plain Tooth.....dis 25%
" " Patent Tooth.....dis 25%
" " Champion Tooth.....dis 25%
Boynton's Lightning Cross Cut, new list.....dis 20 %
" One Man, all lengths, " .....dis 20 %
" Billet Webs, 30 inch, " .....dis 25 %
" Lightning Buck Saws, cross bar..dis 25 %
" " Hand, Panel and Rip....dis 25 %

Shovels and Spades.
Rowland.....dis 40&10 %
Oliver Ames & Sons, new list.....dis 10 %
Griffith.....dis 40&10 %

Sad Irons.—4 to 10 lbs.....₩ lb 4c
Mrs. Potts' Patent.....dis 30 %

Stone.—Arkansas Oil Stone.....₩ lb $2.00 net
Washita Extra.....₩ lb 270 net
" No 1....." 18c
" No. 2....." 15c
" Slips....." 36c
" Axe....." 18c net
Turkey Oil Stone No. 1.....₩ lb $1.00 net
Hindostan Oil Stone No. 1.....₩ lb 6c } dis 30 & 10 %
" Axe Stone..... " 8c }
" Slips..... " 10c }

Screws.
Flat Head Iron.....dis 45 %
Brass.....dis 35 %
Round Head Brass.....dis 20 %
Iron.....dis 35 %

Spoons.
Plated.....dis 33⅓&5 %
German Silver.....dis 20&10 %
Britannia, Boardman's.....dis 55 %
" Parker's.....dis 55 %
Tinned.....dis 10 %

Springs.—Torrey.....₩ doz $2.10 10 %
Philadelphia....5 in., $4.00; 8 in., $7.00 ₩ doz. dis 25 %
Chatfield No. 1, $2.75; 2, $3.25; 3, $4.00 ₩ doz, dis 33⅓ %
Gem Coil No. 1, Large Jap'd.....₩ doz $3.50 }
" No. 2, Medium Jap'd..... " 2.50 } net
" No. 3, Small Jap'd..... " 2.00 }

Stocks and Dies......dis 10&5 %

Steve Polish.—Gem.....₩ gross, $4.50, dis 5 %
Dixon..... " 5-75 net
Onyx..... " $4.00 @ 4.25 net

Tacks, Brads, &c......dis 30&10 %
Shoe Nails—4-8, 9½c 3½-8, 10c ₩ lb..... net
Double Pointed Tacks.....dis 40&5 %

Traps.
Genuine Oneida—Newhouse.....dis 30 %
Im. Oneida—Newhouse list, first qual.....dis 45 %

Vises.—Solid Box, Trenton new list.....dis 25 %

Wrenches.—Agricultural.....dis 60 %
Coes' Genuine.....dis 50 %
" " Mechanics'.....dis 50&10 %
" " Mall. Bar.....dis 65 %
Philada. Tool Co., Duplex.....dis

Wire.
Bright or Ann'd, No. 0 to 18.....dis 45 to 50 %
" " No. 19 to 26.....dis 52½ to 57 %
" " No. 27 to 36.....dis 60 to 65 %
Coppered, 0 to 18.....dis 40 to 45 %
Tinned Broom Wire.....dis 47½ to 50 %
Galvanized No. 7 to 18....Market List, dis 35 to 37½ %

Wringers.
Peerless No. 2½.....$60.00
" " 2.....63.00
Universal, No. 2½.....60.00
" " 2.....63.00
Novelty, No. 10.....60.00
" " 2.....63.00

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

Flat Bar.

1½ to 4 by ⅛ to 1 inch.....2.50
4½ to 6 by ⅛ to 1 " 2.60
1½ to 6 by 1¼ to 1½ " 2.90
1¼ and 1½ by ¼ to ¾ " 2.60
1 and 1¼ by ¼ to ¾ " 2.70
⅝, ¾ and ⅞ by ⅛ to ⅝ inch.....2.90

Rounds and Squares.

1 to 1⅞.....2.50 | ⅝ to 9-16.....2.70
2 to 2⅝.....2.70 | ½ to 7-16.....2.90
2¾ to 3¼.....3.00 | ⅜.....3.10
3⅜ to 4.....3.50 | 5-16.....3.30
4¼ to 5.....4.00 | ¼.....3.40
⅝ to ⅞.....2.60 | 3-16.....5.50

Oval Iron.

⅞ to 1⅛.....2.90 | ⅛.....3.30
1¼ to 1¾.....3.10 | ⅜.....3.70

Half Oval and Half Round.

⅞ to 1¼ inch.....2.20 | ⅛ inch.....4.00
1⅜ to 1¾ " .....3.70 | ¼ " 5.50

Horse Shoe.

⅜ to 1¼ by 5-16 to ⅜ inch.....3.40

Wagon Box Iron.

⅞ Inch, Nos. 13 and 14.....3.70
⅞ " " 11 and 12.....3.50
1 " " 13 and 14.....4.00
1 " " 11 and 12.....3.80
1⅛ " " 13 and 14.....4.40
1⅛ " " 11 and 12.....4.10

Heavy Bands.

1¼ to 6 by ⅛ and 5-16 inch.....2.70
1½ to 3¼ by ¼ and 5-15 " 2.70
1 to 1⅜ by ¼ and 5-16 " 2.80
⅞ to ⅞ by ⅛ and 5-16 " 3.00
⅝ and ⅞ by ¼ and 5-16 " 3.40

Light Bands.

1½ to 6 by ⅛ to 3-16.....3.00
1½ to 6 by Nos. 11 and 12.....3.10
1 to 1⅜ by ⅛ to 3-16.....3.10
1 to 1⅜ by Nos. 11 and 12.....3.20
⅞ and 13-16 by ⅛ to 3-16.....3.40
⅞ and 13-16 by Nos. 11 and 12.....3.50
⅝ and 11-16 by ⅛ to 3-16.....3.70
⅝ and 11-16 by Nos. 11 and 12.....3.80
⅝ and 9-16 by ⅛ to 3 16.....4.00
⅝ and 9-16 by Nos. 11 and 12.....4.10
⅛ inch by ⅛ and 3-16.....4.30
⅛ inch by Nos. 11 and 12.....4.40

Hoop Iron.

1¼ to 4, Nos. 13, 14 and 15.....3.30
1¼ to 2, Nos. 16, 17 and 18.....3.40
1¼ to 2, No. 19.....3.50
1¼ to 2, No. 20.....3.60
1¼ to 2, No. 21.....3.70
1¼ to 2, No. 22.....3.80
15-16, 1, and 1⅛, Nos. 13, 14 and 15.....3.50
15-16, 1, and 1⅛, Nos. 16, 17 and 18.....3.60
15-16, 1, and 1⅛, Nos. 19 and 20.....3.70
15-16, 1, and 1⅛, No. 21.....3.80
15-16, 1, and 1⅛, No. 22.....3.90
⅞, Nos. 13, 14 and 15.....3.70
⅞, Nos. 16, 17 and 18.....3.80
⅞, Nos. 19 and 20.....3.90
⅞, No. 21.....4.00
⅞, No. 22.....4.10
13-16, Nos. 13, 14 and 15.....3.90
13-16, Nos. 16, 17 and 18.....4.00
13-16, Nos. 19 and 20.....4.10
13-16, No. 21.....4.20
13-16, No. 22.....4.30
¾, Nos. 13, 14 and 15.....4.00
¾, Nos. 16, 17 and 18.....4.10
¾, Nos. 19 and 20.....4.20
¾, No. 21.....4.30
¾, No. 22.....4.40
11-16, Nos. 13, 14 and 15.....4.20
11-16, Nos. 16, 17 and 18.....4.30
11-16, Nos. 19 and 20.....4.40
11-16, No. 21.....4.50
11-16, No. 22.....4.60
⅝, Nos. 13, 14 and 15.....4.40
⅝, Nos. 16, 17 and 18.....4.50
⅝, Nos. 19 and 20.....4.60
⅝, No. 21.....4.70
⅝, No. 22.....4.80
⅝, No. 23.....4.90
9-16, Nos. 13, 14 and 15.....4.60
9-16, Nos. 16, 17 and 18.....4.70
9-16, Nos. 19 and 20.....4.80
9-16, No. 21.....4.90
9-16, No. 22.....5.00
9-16, No. 23.....5.10
½ inch, Nos. 13, 14 and 15.....4.80
½ " Nos. 16, 17 and 18.....4.90
½ " Nos. 19 and 20.....5.10
½ " No. 21.....5.20
½ " No. 22.....5.30
½ " No. 23.....5.40

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.

1¼ to 2 in., cut to length.

9 to 11 lbs, per set of 6 hoops.....3.50
8 lbs. and less than 9 lbs. per set of 6 hoops.....3.60
Less than lbs. per set of 6 hoops.....3.80

Extras for Cutting to Length all Preceding Iron.
All Iron, including Tire.....1.00c

Tank Iron.

No. 9 and heavier.....3.30
Plow Slabs.....3.50
" Wings.....3.80

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.40	5.00	6.50
No. 15 to 17	3.80	5.40	6.80
No. 18 to 21	4.10	5.60	7.10
No. 22 to 24	4.30	5.80	7.30
No. 25 & 26	4.50	6.00	7.50
No. 27	4.70	6.20	7.70
No. 28	4.10	6.60	8.10

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.

1st quality (A).....12c | 2d quality (B).....10½c

Galvanized Iron—Juniata.

Nos. 14 to 20.....12c | No. 27.....15c
Nos. 21 to 24.....13c | No. 28.....16c
Nos. 25 and 26.....14c | No. 29.....18c

Current discount to jobbers, 1st quality, 27½ %; 2d quality, 37½ %.

Coal Screen Iron.

4¾ by ⅝ by 5-16.....2.00 | 1 by ⅝ by 5-16.....3.50

Angle Iron.

2½, 3, 3½ and 4 inch.....3.30
1¼, 1¾, 2 and 2¼ inch.....3.30
1¼ inch.....3.40
1 " 3.60
1¼ by 1 inch, for Plow Handles.....3.80
1½ by ¾ " " " 3.80
1¾ by ¾ " " " 3.90

T Rail.

8 lbs. to the yard.....2.90 | 20 lbs. to the yard.....2.90
12 " " .....2.90 | 28 " " 2.90
16 " " .....2.90 | 40 " " 2.90

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 28 and 30-lb. Rail, 50c each; 40 lb., 60c each.
3½ by ⅜ and ½ Spikes for 20 and 28-lb. Rail.....4½c
2½ and 3 by ⅜ " " 12 and 16-lb. " 4½c
2½ by 5-16 " " 8-lb. Rail.....5¼c

Flat Rails.—Punched and Countersunk.

1¾ to 2 by ⅛ to ⅝ inch.....3.00
1½ by ⅜ and 7-16 inch.....3.20
1¼ by ⅞, 7-16 and ½ inch.....3.40

Juniata Nail Rods.....6.50
Norway " 8.00
Guard Iron, 7-16x⅞x1⅝ and 7-16x⅝x1⅝.....4.00
" ⅝x⅞x9-16 and ⅜x⅝x1¼.....4.20
Drag Bars.....3.30
Dropper Bars.....3.80
Cylinder and Landside Iron.....3.20
Plow Beam Iron.....3.00

Nails.
10d to 60d.....$3.00

Best Quality Refined Cast Steel.

Square, Flat, Octagon and Round.

⅜ to 2 inches, inclusive.....13 c
5-16 and 2¼ to 3 inches.....14 c
¼ and 3¼ to 4 " .....15 c
7-32 and 4¼ to 5 " .....16 c
3-16 and 5¼ to 6 " .....19 c
5-32 inch.....23 c
¼ inch.....31 c
Oil Well Steel Forgings.....21½c
No grade of Crucible Tool Steel shall be sold for less than above prices.

Machinery Steel.

	Crucible.	Bessemer & Open Hearth.
Ordinary Sizes, ⅜ to 2 inch		
Round	7½c	6c
5-16 and 2¼ to 3 inches	8½c	7c
¼ and 3¼ to 6 "	9½c	8c
7-32 inch	10½c	9c
3-16 "	12½c	11c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra.

Hammer Cast Steel.

2 inches and under.....8½c
Above 2 inches.....9½c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	13c	11c	9c	6½c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.

Auger and Auger Bit.....8½c
Axle Steel for carriages and wagons.....8½c
Frog Points and Plates.....10c
" Side Bars.....8c
Pick, plain.....5½c
" and Mattock, beveled.....9c
Skate Steel.....8½c
Table Cutlery.....9c
Pike and Cant Hook.....9c
Coal and Granite Wedge.....9c
Roller.....9c
Spindle, subject to Machinery classification.....8½c
Trap Spring Steel.....9½c
Forged Crank Pins and Lathe Spindles.....10½c
Piston Rods, plain.....8c
" forged to shapes.....10½c
Slide Bars, plain.....8c
" forged to shapes.....10½c

Crucible, Open Hearth or Bessemer.

Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick.....
Boiler, Fire-Box and Flue Sheets, not less than ⅛ thick.....
Circulars and semi-circulars, when ordered separately.....
Smoke Stack, to shape.....
Locomotive Tank Steel.....

File Cast Steel.

Square, Round, Half Round and Flat Bastard, 8-inch and over.....9c
Mill Saw, 8-inch and over.....9½c
Taper, 3/16-inch and over.....10½c
Horse and Shoe Rasp.....9½c

Spring Cast Steel.

Spiral and Taper, cut to lengths.....7½c

Tire Cast Steel.

1x¼ and over.....8c
1x3-16, ⅝x3-16 and ¼.....8½c
1 and 13-16x⅜ and 5-32, ⅝x3-16 and 5-32.....9c
⅜ and ⅝x⅛ and 5-32 and 12 g.....9½c
Solid Safe Cast Steel.....7½c

Agricultural Implement Cast Steel.

Fork and Rake, Crucible.....8½c
Horse Rake Steel, cut to lengths, Crucible.....9 c
Hoe, Crucible.....8 c
Corn Stalk Cutter, beveled.....9 c
Beveled Hoe and Shovel Steel in Bars.....9 c
Crucible Plow Steel in slabs.....8½c

Bessemer and Open Hearth.

Spring.....5½c
" spiral and taper, cut to lengths.....6½c
Tire, 3-16 thick and above.....5½c
Toe Calk.....5½c
Plow.....5½c
Axle Billets.....5½c
Sleigh Shoe.....5c
Cutter Shoe, cut to lengths and tapered.....6½c
Scythe Back Steel.....5c
Grain Drill Bars.....8½c
" Points.....9½c
Rolling Coulter Blanks, cut and punched.....10½c
Thrasher Steel.....5½c
" Teeth.....6½c
Rolled Hammer Billets.....4½c
Where Bessemer or Open-hearth Steel can be used in place of Crucible, the difference in price shall not be greater than 1c. per lb., except where especially provided in the list.
Terms.—Four months; 3 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.

Furnace, Floor and Straightening Plates.....2½c
Housings and Castings not otherwise specified.....3 c
Guide Plates.....3½c
Spindles and coupling boxes.....3 c
Sand Rolls and Pinions, large size.....3 c
" " small size.....3½c
Pipe Mill Castings.....4 c
Rolling Mill Castings under 50 lbs.....5 c
Spur and Bevel Wheels, large.....3½c
" small.....4½c
Pulleys up to 30 inches.....4½c
" over 30 inches.....4¾c
Engine Castings, light.....4½c
" heavy.....4 c

Chilled Rolls.

6 to 7 in. diam., 7 to 20 in. long.....5½c
8 to 15 in. " 8 to 40 in. " 5½c
25 to 24 in. " 15 to 72 in. " 5½c
14 to 31 in. " 72 to 108 in. " .....5 c

White and Red Lead.

Strictly Pure White Lead in Oil, in kegs, in lots of 500 lb and over, 9c; less than 500 lb. 9½c in 25 and 50 lb Tin Pails, ½c. ₩ lb over keg price; 12½ lb Tin Pails, 1c ₩ lb over keg price; assorted, 1 to 5 lb, 100 lb Cases, 12c.
Dry White Lead..less than 500 lbs..8¾c; over 500 lbs.8¼c
Orange Mineral, genuine, in kegs, 10c; in barrels, 9 c
Red Lead, very brilliant, " 8c; " 7½c
Litharge (Potter's Lead) " 8c; " 7½c
Freights equalized with all points.
Terms: Note at sixty days, or if paid within 15 days from date of invoice, a discount of 1% per cent. will be allowed, but not otherwise.

Window Glass.

Per Box of 50 Feet.—Discount 50&10 % on single strength, 60&10 % on double.

Single Strength.

Size.	AA.	A.	B.	C.
6 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
17 x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.50
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9.50
26 x 46 to 30 x 50	15.00	14.00	11.25	10.50
30 x 52 to 30 x 54	16.00	14.50	12.00	
30 x 56 to 34 x 56	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	
Double Strength.				
6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 56	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

BEECHER & PECK,

Successors to Milo Peck, Manufacturers of

PECKS DROP PRESS

11 Regular Sizes. Hammers from 50 lbs. to 2500 lbs.

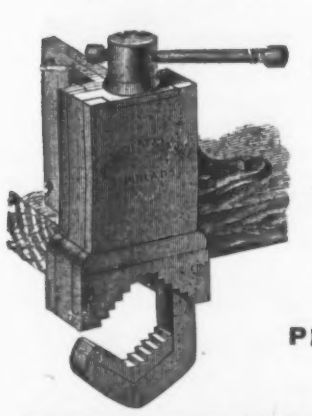
WE HAVE A LARGE STOCK OF SPECIAL DROP PATTERNS.

Special attention given to the making of all Drop Dies.

Special Machinery fitted up to order.

Send for Price List. New Haven, Conn.

IMPROVED PIPE-FITTERS' VISE.

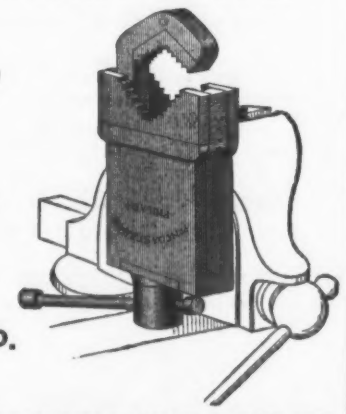


STRONG,

LIGHT,

EFFICIENT,

CHEAP.



PRICE, $8.00.

To meet the requirements of the large number of persons who have use for such an article, we invite attention to our Improved Pipe Vise. This Vise can be used either as a permanent fixture to work-bench, attached to angle plate or can (unlike others) be held between the jaws of any Machinist's or Blacksmith's Vise; the movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without slipping it in from end, and allows of FITTINGS BEING HELD securely; the Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Drivers, and all who have use for a tool that is *strong, light, efficient and cheap* which can be readily carried about with kit of tools.

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PANCOAST & MAULE,

243 and 245 South Third Street, Philadelphia.

Morse Twist Drill and Machine Co.,

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,

Beach's Patent Self-Centering Chuck, Solid and Shell Reamers.

BIT STOCK DRILLS,

Drills for Coes, Worcester, Hunter and other Hand Drill Presses. Beach's Patent Self-Centering Chucks, Center and Adjustable Drill Chucks, Solid and Shell Reamers. Drill Grinding Machines. Taper Reamers, Milling Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.

50 PER CENT. SAVING OF FUEL.

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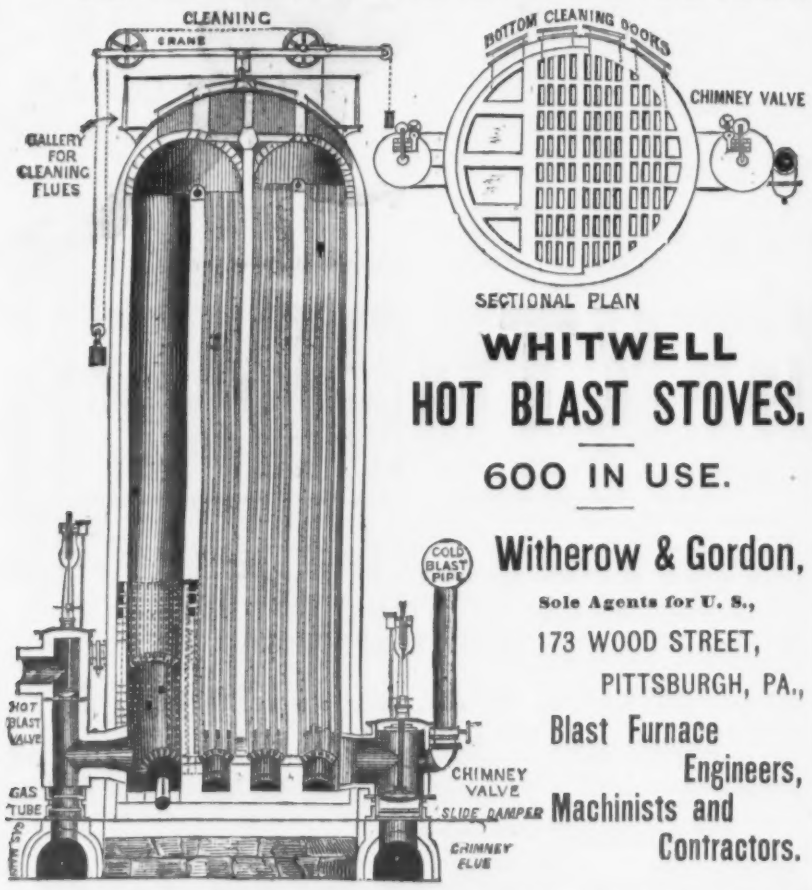


WHITWELL

HOT BLAST STOVES.

600 IN USE.

Witherow & Gordon,

Sole Agents for U. S.,

173 WOOD STREET,

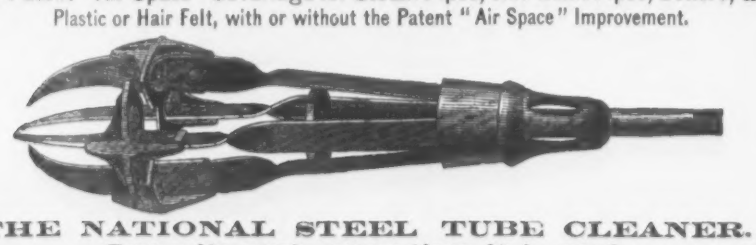
PITTSBURGH, PA.,

Blast Furnace Engineers, Machinists and Contractors.

ASBESTOS MATERIALS, FIBER, MILLBOARD, PACKING AND CEMENT.

The Patent "Air Space" Coverings for Steam Pipes, Hot-Blast Pipes, Boilers, &c.

Plastic or Hair Felt, with or without the Patent "Air Space" Improvement.



THE NATIONAL STEEL TUBE CLEANER.

Saves its cost every time it is used.

THE CHALMERS-SPENCE CO., foot 9th St., E. R., New York.

L. M. RUMSEY & CO.

MANUFACTURERS & JOBBERS OF

PUMPS & IRON WORKING MACHINERY.

LEAD PIPE & SHEET LEAD

GAS PIPE & FITTINGS

PUMP CHAIN

RAILWAY SUPPLIES,

PLUMBERS & STEAM FITTERS BRASS GOODS,

BELTING, HOSE, PACKING &c.

No 804 TO 820 N. SECOND STREET.

ST. LOUIS, MO.

Manufacturers of GALVANIZED PUMP CHAIN FOR CHAIN PUMPS.

PATENT

Expanding, Self-Draining

RUBBER BUCKET.

Manufactured only by

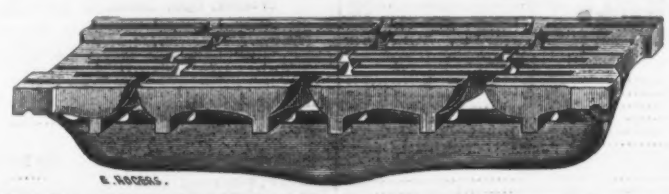
L. M. RUMSEY & CO.

DAVID S. CRESWELL,

816 Race Street, - - - - - PHILADELPHIA, PA.,

Sole Agent and Manufacturer of

W. C. WREN'S PATENT GRATE BAR.



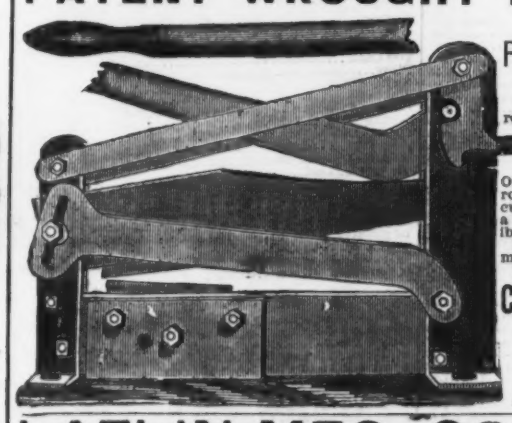
This Grate Bar consists of short parallel bars for carrying the coal, mounted above a long supporting bar, extending across the furnace by short transverse plates, holding the short bars, which sustain the heat so far above the supporting bar that it is kept comparatively cool, and is not, therefore, liable to warp, bend or burn. The bars which are subject to the heat, being made in short sections, do not strain the supporting bar. The short bars break joints at the meeting ends to prevent a straight open space across the whole; also to guide the rake used by firemen in cleaning the furnace better than they otherwise would.

We therefore claim the following advantages over other grate bars offered for sale:

1. Great saving in fuel.
2. Such construction as will equalize all strain resulting from expansion and contraction, thus avoiding warping, and thereby insuring long service.
3. Thorough combustion of fuel, owing to the large air spaces exposed.
4. Bars will not weigh more in proportion than the ordinary bar, and in addition to a saving of 25 per cent in fuel, will last much longer than any other bar in use.

The **WREN GRATE BAR** is in use at the works of the Atlantic Refining Co. and other prominent concerns.

PATENT WROUGHT IRON SHEAR,



With and Without

PUNCH ATTACHMENT,

FOR IRON AND STEEL.

Our No. 103 Machine will cut 4x¾, 1¼ inch round and square and punch ¾-inch hole through ¾-inch iron. Our No. 104 Machine will cut 4x¾, 1 inch round and square and punch ⅞-inch hole through ⅞-inch iron. Our No. 105 Machine will cut 4x¾, 1¼ inch round and square. Our No. 106 Machine will cut 4x¾ inch round and square. Occupies a space of 8x30 inches, weighs from 200 to 400 lbs., made of wrought iron and steel.

It is built so exceedingly strong that two men cannot injure it. Prices from $30 to $45. Liberal discount to the trade.

CLEVELAND HARDWARE CO.,

CLEVELAND, OHIO,

Manufacturers of

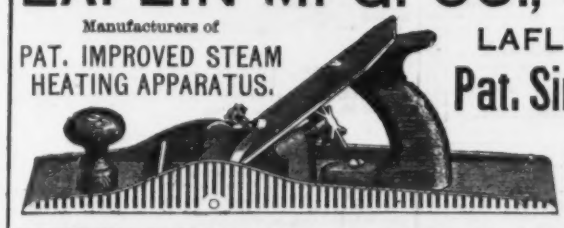
STERLING ANTI-FRICTION BARN-DOOR HANGERS.

Send for Illustrated Circular.

LAFLIN MFG. CO., Westfield, Mass,

Manufacturers of

PAT. IMPROVED STEAM HEATING APPARATUS.



LAFLIN MFG. CO.'S

Pat. Single Iron Plane

Made of extra quality iron. A practical labor-saving tool. Cuts against the grain equally as well as with it. Can be adjusted instantly to cut a coarse or fine shaving, and excels any double iron plane ever produced.

STEPHENS' PAT. VISE

AND ATTACHMENTS,

Stationary and Swivel Bottoms.

Adapted to every variety of work, from jewelers' to locomotive works. Opens FURTHER, holds FIRMER, is HEAVIER and MORE DURABLE than any other Vise. For sale by the Hardware trade.

STEPHENS PAT. VISE CO., No 41 Dey Street, New York.

A. J. DAVIS & CO.,

Patent Friction Hoisting Engines

For Mines, Quarries, Dock Building, &c.

MANUFACTURERS OF

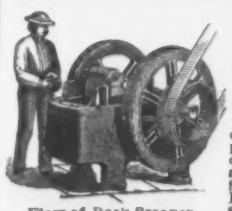
SHAPERS, DRAIN PIPE MACHINES, BAG AND SATCHEL MACHINERY,

Steam Engines, Wire Drawing Machinery, &c., &c.

69 N. J. R. R. Avenue, Newark, N. J.

Correspondence solicited.

The Farrel Foundry and Machine Co.



View of Rock Breaker.

ANSONIA, CONN.,

Manufacture improved

ROCK & ORE BREAKERS,

(THE "BLAKE" STYLE),

designed for breaking to small pieces and one-third dust all kinds of hard and brittle substances, such as **Quartz, Emery, Gold and Silver Ores, Coal, Plaster, Iron, Copper and Lead Ores**; also, **Stone for making Concrete and Railroad Ballast.**

Premium of Excellence, American Institute Fair, 1879.

Twenty years of practical test, at **Home** and **Abroad**, has proven this machine to be the best one ever invented for the purpose. Mr. S. L. MARSDEN, for the past fifteen years connected with the manufacture of these machines, has charge of this department of our works, and will personally superintend their erection within a reasonable circuit. **Chilled Rolls and Rolling Mill Machinery; Power Presses**, single and double acting; also, **Hammers, Drops and Lifters; Shafting, Pulleys and Hangers.**

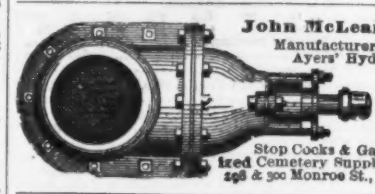
KEYSTONE Portable Forges,

All sizes, for the lightest to the heaviest work, run by Chain Gear and Flat Belts. Strong blast and durable. Send for Catalogue and Price list to

KEYSTONE Portable Forge Co., 290 Carter St., Philadelphia, Pa.

John McLean,

Manufacturer of Ayers' Hydrants



Stop Cocks & Galvanized Cemetery Supplies.

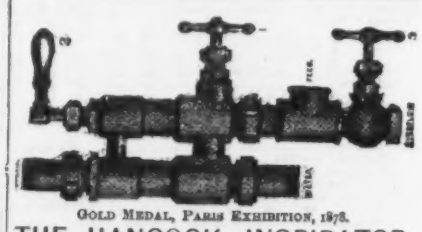
296 & 300 Monroe St., N. Y.

Flanders' Improved Locomotive Cylinder Boring Machine.

Bar and screw of cast steel, with two extra cutter heads. Manufactured and for sale by the

L. B. FLANDERS MACHINE WORKS,

1025 Hamilton St., Philadelphia, Pa.



GOLD MEDAL, PARIS EXHIBITION, 1878.

THE HANCOCK INSPIRATOR,

New Combined Pump and Injector.

Eclipses all other appliances hitherto introduced for feeding Steam Boilers. A Portable Boiler is not put together without one. It lifts its water 25 feet with a low steam pressure, and puts it directly into the Boiler. No adjustment necessary for varying steam pressures.

G. W. STORER, General Agent, 140 N. 3d st., Phila.

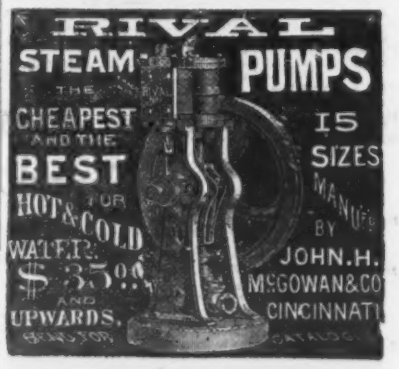
The Buckeye

Upright Drill Press

Is the cheapest and best made. Price, $15. Weighs 65 pounds. Discount to the trade. Send for circular to

A. E. Folger & Co.,

Springfield, O.



BOSTON.

Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.

Anvils.—"Eagle American" ₩ ℔ 9½c. dis 20 %
Apple Parers.
Reading "78" per doz., $7.50
Reading "76" per doz., 6.40
Reading "72" per doz., 5.00
Goodell Turn Table per doz., 5.50
Goodell Improved Turn Table per doz., 7.50
Goodell Family Corer and Slicer per doz., 7.50
Hudson's Improved "80" per doz., 8.50
Goodell Lightning per doz., 6.00
Aiken's Tools. dis 40&10 %
Anvil & Vise.—
No. 1, $6.25; 2, 4.25; 3, 3.50 each dis 25 %
Augurs & Bitts.—Snell's Auger dis 40 %
L'Hommedieu's Shio Augers dis 15 %
Jenning's Bitts dis 10&10&10 %
Cook's Bitts dis 40&10 %
Stearns Hollow Augers No. 3 ₩ doz. $48.00
Sheparson's Double-Cut Bitts dis 45 %
" " Gimlets dis 40 %
Stearn's Extension Hollow Augers per doz $39.00
Bonney's " " per doz 36.00
Pierce's Bitts dis 35 %
Griswold " dis 40 %
Axes.—Blue Jackets per doz 10.00
Red Cross per doz 5.00
" Handled per doz 10.00
Dowse " Boys' dis 30 %
Ax Handles.—
Oak Extra, 31 in., No. A ₩ doz $2.00
" 34 in., No. A ₩ doz 2.25
" 31 in., No. B ₩ doz 1.50
" 34 in., No. B ₩ doz 1.75
" 31 or 34 in., No. C ₩ doz 1.15
Axle Clips dis 45 %
Balances.—Chatillon's dis 15&10 %
Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers) per ft. 30
" Half-Round per ft, ⅝, 50 ⅞, 60c
Wrought " perft, ½, 40; ⅝, 50; ¾, 60
Bells.—Connel's Crank Gong dis 40&10 %
Bird Cages.
Japanned M. B. & D., reduced list, 1879 dis 33⅓ %
Brass " 1879 dis 25 %
Blind Fasts.—Lock Fasts ₩ C sets $6.00
No. 6 Fasts ₩ C sets 6.50
Vezzie Fasts ₩ C sets 6.50
Shedd's ₩ C sets 7.00
Blind Hinges.—Mall. Hook, 3 holes ₩ C sets 8.50
Brad Awl Handles.—
Phœnix Adjustable ₩ doz $2.00
Bolts.—Norway Iron Carriage dis 60 %
Common " dis 70&10 %
Borax.—Refined ₩ ℔ 12½c
Boring Machines.
Eagle Upright each, $5.50 list } dis 33⅓%
Eagle Angle each, 6.75 list }
Snell Augers ₩ set 2.70
Braces.—Barber's dis 40 %
Sponford's dis 40 %
Backus' dis 40 & 10 %
Bracket Saws.—Holly Scroll Saw each, $2.40
Demas Lathe and Scroll Saw 6.40
Bracket Saws, extra quality, to No. 6 ₩ gro $0.75
Steel Frame, with patterns ₩ doz 6.40
Lester dis 20 %
New Rogers, all iron dis 25 %
Bracket Saw Blades.
Griffith's patent ₩ gross 75c
Brackets.—B. B. & M. Flower Pot dis 50&10 %
Bronzed Snelt, M. B. & D newlist dis 40 %
Store Shelf dis 40 %
Bronze Hardware.— dis
Butts.—Union Fast Joint dis 40&10 %
" Loose " dis 50&10 %
" Japanned Acorn dis 55&10 %
" Silvered " dis 55&10 %
" Boston Finish dis 75&10 %
Union Spiral Spring dis 40 %
Wrought Brass dis 45 %
Carriage Bolts.—Eagle Norway dis 65 %
Common dis 70&10%
Carriage Jacks.
"Climax" No. 1 ₩ doz $30.00
" No. 1½ " 15.00
" No. 2 " 13.50
"Universal" dis 25 %
" No. 1 each, $2.00
" No. 2 " 3.00
" No. 3 " 6.00
" No. 4 " 8.00
" No. 5 " 6.00
Cartridges.—U. S. Cartridge Co. dis 60&10 %
Cards.—Watson's makeHorse and Curry dis 10 %
" Cotton dis 10 %
" Wool dis 10 %
Casters.—Bed and Table dis 33⅓&10 %
Chain.—Traces 6½, 10, 4, streight ₩ pair 50c
" 6½, 10, 4, twisted ₩ pair 55c
" 7, 12, 2, " ₩ pair 75c
Coil 5-16 ₩ ℔ 11 c
" ¾ ₩ ℔ 8½c
" 5-16 ₩ ℔ 8 c
" ⅜ ₩ ℔ 7½c
" 7-16 ₩ ℔ 6½c
" ½ ₩ ℔ 6½c
Chalk.—White, Carpenter's ₩ gross 80c
Red, Carpenter's ₩ gross 80c
Blue " ₩ gross $1.00
Chisels.—Hart, Bliven & Mead, Framing dis 45 %
Underhill, Framing dis 20 %
Buck's Chisels dis 30 %
Clothes Line.—
Galvanized Wire, 100 feet each ₩ doz $4.50
Coat Hods.—"Dover."—Galvanized, new list dis 50 %
Japanned, new list dis 50 %
Coffee Mills.—New list dis 35 %
Copper Rivets. dis 40 %
Cocks.—Brass, L. F. & C. dis 40 %
Cordage.—Manila, usual trade dis 10 ₩ ℔ 12½c
Jute ₩ ℔ 11c
Cow Ties. dis 33⅓ %
No. 30, 3 ft. No. 6 Wire, with toggle ₩ doz $3.00
No. 35, 3 ft. " " with snap ₩ doz 3.80
No. 40, 3½ ft. " " with toggle ₩ doz 3.90
No. 45, 3½ ft. " " with snap ₩ doz 4.10
No. 50, 4 ft. No. 4 " with toggle ₩ doz 4.50
No. 55, 4 ft. " " with snap ₩ doz 4.75
No. 60, 4½ ft. " " with toggle ₩ doz 5.25
No. 65, 4½ ft. " " with snap ₩ doz 5.60

Crow-Bars, Cast Steel ₩ ℔ 8c
Iron Steel Pointed ₩ ℔ 5c
Cutlery.—Pocket, American Shear Co.'s dis 40 %
Butcher Knives, "Woods," Lap Bolster.
Square Handle dis 20 %
Steak Knives dis 10 %
Lap Bolster, Oval Handle dis 10 %
Sticking dis 20 %
Skinning dis 20 %
Butcher, Common Round Handle, "Woods" dis 20 %
Shoe Knives, "Woods" dis 20 %
Dividers.—Cook's dis 25 %
Dog Collars ₩ doz
Dog Muzzles.—Automatic
Door Springs.—Torrey's Rod ₩ doz $2.00
Imitation Torrey's Rod ₩ doz $1.75
Gem Coil net list
Crown ₩ doz $2.25
Warners ₩ doz $2.00
Door Stops.—"Thurston's" dis 25 %
Drawer Knobs.—"Thurston's dis 45
Drills.—Morse Bitt Stock dis 20 %
Morse Straight Shank dis 20 %
Emery.—Wellington Mills ₩ ℔
The Alden Emery Co. ₩ ℔
Turkish in 10 ℔ cans ₩ ℔
Enamelled Ware.
Standard Mfg. Co. Kettles dis 40 & 10 %
" Sauce Pans dis 25 %
Felloe Plates.—Wrought ₩ ℔ 8c
Files.
American File Co. dis 30 %
Nicholson " dis 30 %
Fluting Machines.
Knox list, $2.00 dis 10 %
American list, $3.40 dis 10 %
Forks. W. C. & Co., Manure dis 40 %
Gimlet Bitts.
Genuine German, No. 125, 1-32 to 8-32, per doz $1.00
Pierce's per doz 58c
Glass Cutters.
Combination Class Cutter and Knife Sharpener ₩ doz $1.00
Grub Hoes.—K. P. & Co.'s No. 2, 11.50 ₩ doz. dis 30 %
Hammers.—Maydole's dis 10 %
Hammond's (new list.) dis 20 %
Hangers & Rollers.—Anti-Friction dis 50&10 %
Acme Rollers dis 30 %
Climax dis 40 %
Common Hangers dis 30&10 %
" Rollers dis 35&10 %
Hand Screws. dis 10 %
Hatchets.—C. F. Dowse new list dis 30 %
Underhill dis 25 %
Hay Knives.—Lightning ₩ doz $18.00 net
Fisher's Patent ₩ doz @14.00
Hinges.—Strap and T (new list) dis 40&10 %
Providence Plate ₩ ℔ 5c
Wrought Screw Hook ₩ ℔ 5c
Hoes.—W. C. & Co.'s. dis 40 %
Hooks and Staples.—Brewers' dis 40 %
Horse Nails. No. 6 7 8 9
National Finished .23 .21 .20 .19 dis 20 %
Putnam Pointed .26 .24 .23 .22 10 %
Horse Nails.—Bridgewater dis 25 %
No. 6 21; No. 7, 21, No. 8, 20; No. 9, 19.
Ice Cream Freezers.—"Packer's" dis 40 %
Knobs.—"Norwalk." New list dis 50 %
Silver Glass dis 50&10 %
" Bell Pulls dis 40&10 %
Lanterns.—Tubulars, No. 0 ₩ doz 3.00
Railroad, Oil, No. 43 ₩ doz 9.00
Triangular ₩ doz 4.00
Hurricane dis 20 %
Lead.—Sheet ₩ ℔ 7 c
Pipe ₩ ℔ 9½c
Locks.—Norwalk Genuine Bronze Goods dis 30 %
Eagle Cabinet dis 10 %
" Trunk list net
W. Wilcox & Co., Padlocks dis 45 %
American Lock Co.'s Steel Key dis 33⅓ %
Manure Forks.—W. C. & Co. dis 40
Mattocks.—K. P. & Co., Long Cutter, 12.00 ₩ doz.
K. P. & Co., Short Cutter, 14.40 ₩ doz. dis 30 %
" " Pick " 16.80 ₩ doz. dis 30 %
Measuring Tapes.—Eddy's dis 20
Meat Cutters.—Miles' Challenge dis 30 %
Hale's, (New list) dis 40 %
American dis 25 %
Money Drawers.—Tucker's Alarm ₩ doz $22.00
Mouse Traps.—Delusion ₩ doz 2.00
Novelty ₩ doz 1.75
Nails. ₩ keg, 3.00 rates
Oilers.—Zinc and Tin dis 45 %
Brass and Copper dis 33⅓ %
Ox Bows.—Extra finished and varnished list net
1¼ in., ₩ doz. pair, $5.75 | 2 in., ₩ doz. pair $9.00
1¾ in., " " " 8.00 | 2½ " " " 11.00
Padlocks.—W. Wilcox & Co.'s dis 45 %
Miller's Brass ₩ doz $7.50
Paper.—Tarred Sheathing ₩ ℔ 2½c
Dry Sheathing ₩ ℔ 2½c
Picks.—K. P. & Co., Adze Eye, 5 to 6 ℔ 12.00 dis 30 %
" " 6 to 7 ℔ 13.00 dis 30 %
Planes.—Greenfield Tool Co. dis 25 %
N. Y. Tool Co. dis 20 %
English Iron dis 20 %
Bailey's dis 20&10 %
Plated Ware.—Rogers & Bro. dis 33⅓&5 %
Pliers.—Vom Cleff & Co.'s net list
Sutton's Wire Pliers dis 33⅓ %
Plumb & Levels.—Stanley, R. & L. Co. dis 60&10 %
Pocket Knives.
American Shear Co.'s dis 33⅓&10 %
Potato Diggers.—W. C. & Co. reduced list dis 40 %
Pulleys
Acme or Excelsior, 1¾ in. per doz 33c
" " 2 in. " 36c
Pulley Blocks dis 40 %
Pumps.—Union Manufacturing Co.
Iron Cistern dis 35 %
" Pitcher Spout dis 35 %
Copper dis 40
Rivets.—Black dis 40
Carriage in 10 ℔ papers dis
Copper dis 45 %
Razor Strops.—Torrey's Full line.
Rules.—Stanley Boxwood, dis 60&10 %
" Ivory dis 40&10 %
Sadirons.—Common ₩ ℔ 3½c
Laundry ₩ ℔ 6½c
Tailor's Geese ₩ ℔ 8c
Enterprise, "Potts" ₩ ℔ 8c
Sash Locks.—King & Hutchinson's, new list dis 40 %
Sandpaper.—Baeder & Adamson dis 25&5 %
M. B. & D. dis 25&5 %
Sash Weights.—Patent Eye ₩ ℔ 1½c
Saws.—Hand Saws, Disston's dis 20 %
Wheeler & Clemson dis 20 %
Cross-Cut Saws.
W. M. & C., Common Tooth, No. 1 ₩ foot 38c
" " Champion " ₩ foot 40c
Disston's, Common " ₩ foot 44c
" Gt. American " ₩ foot 45c
Boynton's Lightning " ₩ foot 60c
M. B. & D., Hand Saws dis 25 %
W. M. & Co.'s. Circular Saws dis 35 %
Richardson Bros dis 25 %
Saw Blades.—Disston dis 5
W. M. & C. dis 12 %
Welch & Griffith, Extra ₩ doz $8.40
" " No. 2 ₩ doz 7.00
Scales.—Fairbanks dis 20 %
Screws.—Aiken's Flat-Head Iron dis 45 %
American Flat-Head Iron dis 45 %
" " Brass dis 35 %
" Round-Head " dis 20 %
" " Iron dis 30 %
Grilley " Nickel-plated Common dis 40
Scythes.—Clippers, in boxes ₩ doz $9.00
Shaves.—Kimball's ₩ inch 75c
Watrous dis 15 %
Shears.—American Shear Co., new list dis 70 %
Shot.—Tatham's ₩ ℔ 7½c
Shovels.—O. Ames, new list dis 10 %
O. Ames, other brands, new list dis 10 %
M. B. & D. dis 10 %
Oxford Birmingham Pattern dis 10 %
Sinks.—Magee Patent dis 15 %
Snow Shovels.—Malleable tips ₩ doz $5.00
Skates.—Union dis 25 %
Acme dis 20 %
Stock and Dies.—King's dis 10&5 %
Tacks.—A. Field & Son's dis 35&17 %
Pittsfield dis 35&10 %
Swedes Tinned 60&10 %
Swedes Iron 35&10 %
Gimp and Lace 35&10 %
Copper Tacks 35&10 %
All balances on list. 25&10 %
Traps.—Oneida, Genuine dis 33⅓ %
Oneida, Imitation, H. & N dis 50 %
Blake's dis 40 & 10 %
Vises.—Simpson's Adjustable dis 25&5 %
Howard Vise Co. dis 20 %
Prentiss' dis 20 %
Weather Strips.—Packer's ₩ doz $4.50
Browne's Flexible Rubber dis 30 %
In 20 feet boxes; No. 1, ⅛ in. wide, ₩ yard, 10c.; No. 2, ⅜ in., 15c.; No. 3, ¾ in., 20c.; No. 4, 1 in., 25c
Black Walnut Spring Weather Strips ₩ doz. $3.00
Window Springs. dis 20 %
Babcock's No. 1 ₩ gross $ 6.25
" " 4 ₩ gross 4.15
Wire Cloth.—"Clinton" ₩ ft. 3½c
Wire Fence.
Scutt's Patent, Painted ₩ ℔ 8½c
" Galvanized ₩ ℔ 10c
Wire Goods.—Gate Hooks and Eyes, &c new list. dis 60&10 %
Wrenches.—A. G. Coe's. dis 50 %
Girard Mfg. Co. dis 50&10 %
Girard Agt. dis 60 %
Wringers.—Universal, No. 2 ₩ doz $63.00
Universal, No. 1½ ₩ doz 60.00
Novelty, No. 10 ₩ doz 60.00
" No. 2 ₩ doz 63.00
" No. 22 ₩ doz 67.00
Excelsior, No. A ₩ doz 75.00
" No. B ₩ doz 78.00
" No. CC ₩ doz 85.00
Novelty Set Tub, K ₩ doz 64.00
Eureka ₩ doz 54.00
Keystone, Wood Frame No. 1½ ₩ doz $4.00
" Iron Frame No. 2½ ₩ doz 14.00
Zinc. ₩ ℔ 7½c
Withington, Cooley & Co.—Hose, Rakes, Forks, &c. dis 40 & 5. Special rate for Export.

Machinery, &c.

THE JUDSON GOVERNOR,

WITH

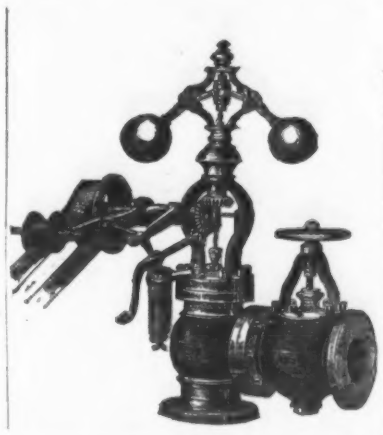
Stop-Motion,

Spring Speeder,

Sawyer's Lever

AND

Stop Valve.



PRICE LIST,

May 10, 1880.

Size, Inch.	Plain.	Bright Finished.	Extra for Spe'd'r	Stop M't'n & Spe'd'r.
½	$15.00	$17.00	$1.60	....
¾	16.00	18.00	1.70	....
1	18.00	20.00	1.80	....
1¼	20.00	23.00	1.90	....
1½	23.00	27.00	2.00	$4.50
2	27.00	31.00	2.20	6.00
2¼	32.00	37.00	2.40	7.00
2½	36.00	41.00	2.60	7.00
2¾	40.00	46.00	2.80	8.00
3	45.00	52.00	3.00	8.00
3½	54.00	62.00	3.25	9.00
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5	84.00	95.00	4.00	12.00
5½	97.00	109.00	4.25	14.00
6	110.00	123.00	4.50	15.00
7	130.00	144.00	5.00	17.00
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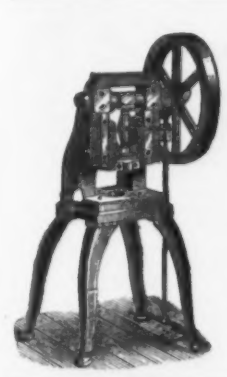

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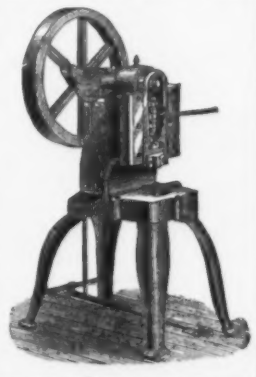

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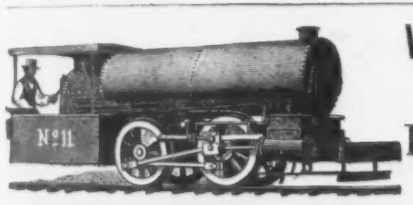

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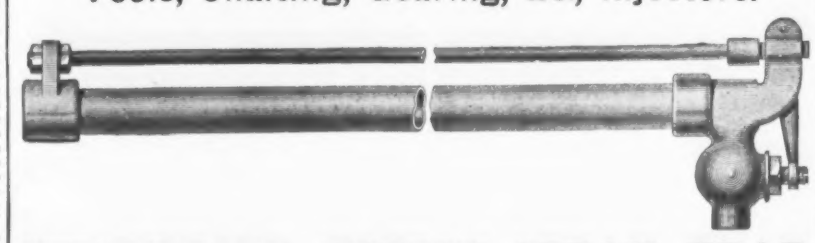

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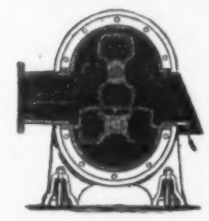

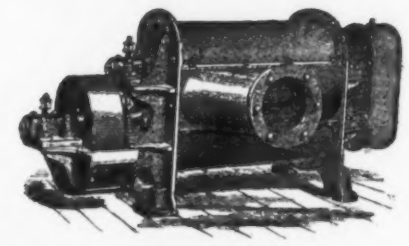

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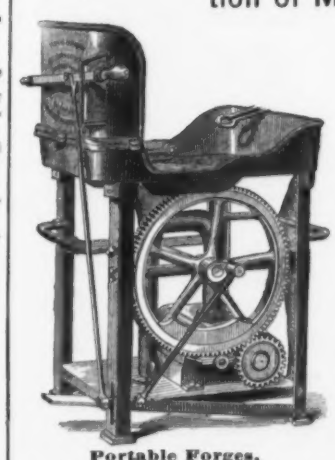

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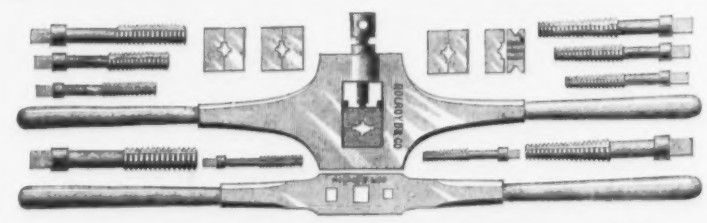

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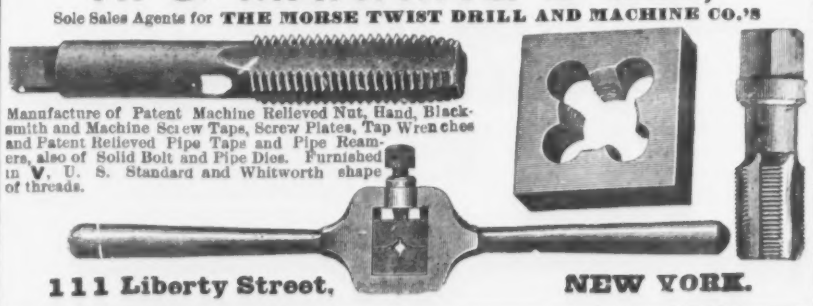

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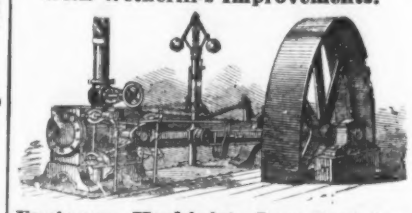

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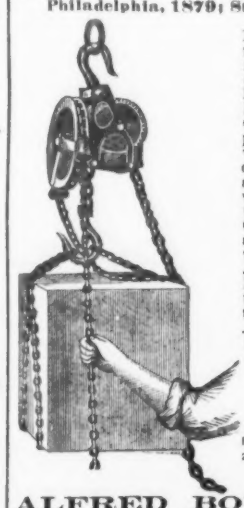

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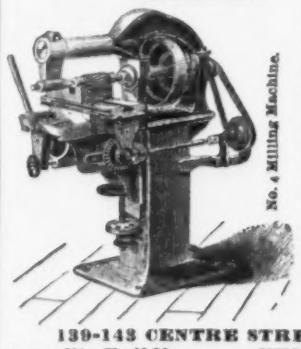

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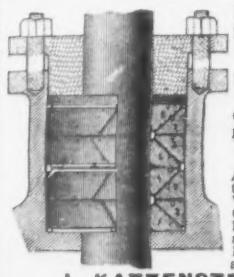

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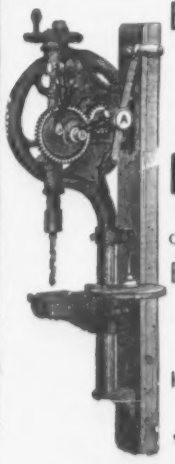

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